

697.1 Smith
STEAMFITTERS'
HANDBOOK

OF
DIRECT AND INDIRECT
RADIATORS

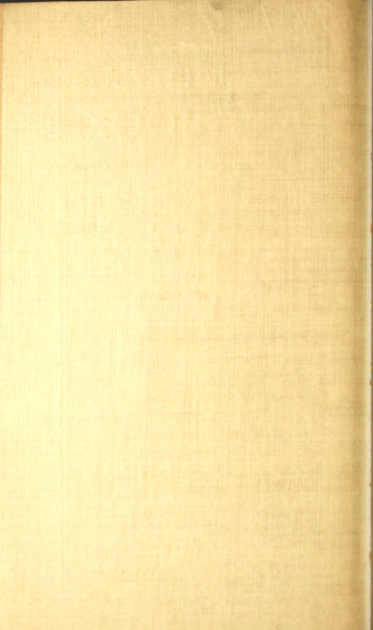


THE H. B. SMITH CO.

728 Arch Street, PHILADELPHIA

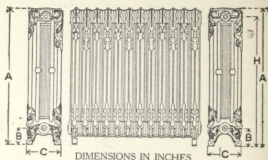
Works:
WESTFIELD, MASS.

Salesroom:
133 CENTRE STREET
NEW YORK, N. Y.



DIRECT
RADIATORS

IMPERIAL UNION—STEAM and WATER



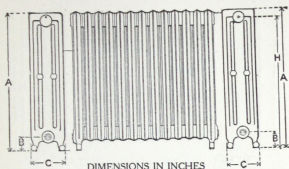
DIMENSIONS IN INCHES

A	Height of Radiator.....	45	37	31	25	19
H	Height of Top Tapping..	43	35 $\frac{1}{8}$	29 $\frac{1}{8}$	23	17 $\frac{1}{8}$
B	Height of Regular Tapping	4 $\frac{3}{8}$ inches				
C	Width of Section.....	9 "				

LIST OF SIZES

Number of Sections	Total Length Feet Inches	RADIATING SURFACE (Square Feet)				
		45 in. High	37 in. High	31 in. High	25 in. High	19 in. High
3	0 10 $\frac{3}{4}$	24	19 $\frac{1}{2}$	16 $\frac{1}{2}$	13 $\frac{1}{2}$	10 $\frac{1}{2}$
4	1 2	32	26	22	18	14
5	1 5 $\frac{1}{4}$	40	32 $\frac{1}{2}$	27 $\frac{1}{2}$	22 $\frac{1}{2}$	17 $\frac{1}{2}$
6	1 8 $\frac{1}{2}$	48	39	33	27	21
7	1 11 $\frac{1}{4}$	56	45 $\frac{1}{2}$	38 $\frac{1}{2}$	31 $\frac{1}{2}$	24 $\frac{1}{2}$
8	2 3	64	52	44	36	28
9	2 6 $\frac{1}{4}$	72	58 $\frac{1}{2}$	49 $\frac{1}{2}$	40 $\frac{1}{2}$	31 $\frac{1}{2}$
10	2 9 $\frac{1}{2}$	80	65	55	45	35
11	3 $\frac{1}{4}$	88	71 $\frac{1}{2}$	60 $\frac{1}{2}$	49 $\frac{1}{2}$	38 $\frac{1}{2}$
12	3 4	96	78	66	54	42
13	3 7 $\frac{1}{4}$	104	84 $\frac{1}{2}$	71 $\frac{1}{2}$	58 $\frac{1}{2}$	45 $\frac{1}{2}$
14	3 10 $\frac{1}{2}$	112	91	77	63	49
15	4 1 $\frac{1}{4}$	120	97 $\frac{1}{2}$	82 $\frac{1}{2}$	67 $\frac{1}{2}$	52 $\frac{1}{2}$
16	4 5	128	104	88	72	56
17	4 8 $\frac{1}{4}$	136	110 $\frac{1}{2}$	93 $\frac{1}{2}$	76 $\frac{1}{2}$	59 $\frac{1}{2}$
18	4 11 $\frac{1}{4}$	144	117	99	81	63
19	5 2 $\frac{1}{4}$	152	123 $\frac{1}{2}$	104 $\frac{1}{2}$	85 $\frac{1}{2}$	66 $\frac{1}{2}$
20	5 6	160	130	110	90	70
21	5 9 $\frac{1}{4}$	168	136 $\frac{1}{2}$	115 $\frac{1}{2}$	94 $\frac{1}{2}$	73 $\frac{1}{2}$
22	6 $\frac{1}{4}$	176	143	121	99	77
23	6 3 $\frac{1}{4}$	184	149 $\frac{1}{2}$	126 $\frac{1}{2}$	103 $\frac{1}{2}$	80 $\frac{1}{2}$
24	6 7	192	156	132	108	84
25	6 10 $\frac{1}{4}$	200	162 $\frac{1}{2}$	137 $\frac{1}{2}$	112 $\frac{1}{2}$	87 $\frac{1}{2}$
List Price in Cents per Square Foot		41	42	46	50	57

PRINCESS UNION—STEAM and WATER



DIMENSIONS IN INCHES

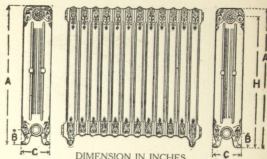
A	Height of Radiator	45	37	31	25	19
H	Height of Top Tapping .	43	$35\frac{1}{2}$	$29\frac{1}{2}$	23	$17\frac{3}{4}$
B	Height of Regular Tapping	$4\frac{5}{8}$ inches				
C	Width of Section	9 "				

LIST OF SIZES

Number of Sections	Total Length		RADIATING SURFACE (Square Feet)				
	Feet	Inches	45 in. High	37 in. High	31 in. High	25 in. High	19 in. High
3	0	$10\frac{3}{4}$	24	$19\frac{1}{2}$	$16\frac{1}{2}$	$13\frac{1}{2}$	$10\frac{1}{2}$
4	1	2	32	26	22	18	14
5	1	$5\frac{1}{4}$	40	$32\frac{1}{2}$	$27\frac{1}{2}$	$22\frac{1}{2}$	$17\frac{1}{2}$
6	1	$8\frac{3}{4}$	48	39	33	27	21
7	1	$11\frac{3}{4}$	56	$45\frac{1}{2}$	$38\frac{1}{2}$	$31\frac{1}{2}$	$24\frac{1}{2}$
8	2	3	64	52	44	36	28
9	2	$6\frac{1}{4}$	72	$58\frac{1}{2}$	$49\frac{1}{2}$	$40\frac{1}{2}$	$31\frac{1}{2}$
10	2	$9\frac{1}{2}$	80	65	55	45	35
11	3	$\frac{3}{4}$	88	$71\frac{1}{2}$	$60\frac{1}{2}$	$49\frac{1}{2}$	$38\frac{1}{2}$
12	3	4	96	78	66	54	42
13	3	$7\frac{1}{4}$	104	$84\frac{1}{2}$	$71\frac{1}{2}$	$58\frac{1}{2}$	$45\frac{1}{2}$
14	3	$10\frac{1}{2}$	112	91	77	63	49
15	4	$1\frac{3}{4}$	120	$97\frac{1}{2}$	$82\frac{1}{2}$	$67\frac{1}{2}$	$52\frac{1}{2}$
16	4	5	128	104	88	72	56
17	4	$8\frac{1}{4}$	136	$110\frac{1}{2}$	$93\frac{1}{2}$	$76\frac{1}{2}$	$59\frac{1}{2}$
18	4	$11\frac{3}{4}$	144	117	99	81	63
19	5	$2\frac{3}{4}$	152	$123\frac{1}{2}$	$104\frac{1}{2}$	$85\frac{1}{2}$	$66\frac{1}{2}$
20	5	6	160	130	110	90	70
21	5	$9\frac{1}{4}$	168	$136\frac{1}{2}$	$115\frac{1}{2}$	$94\frac{1}{2}$	$73\frac{1}{2}$
22	6	$\frac{1}{2}$	176	143	121	99	77
23	6	$3\frac{3}{4}$	184	$149\frac{1}{2}$	$126\frac{1}{2}$	$103\frac{1}{2}$	$80\frac{1}{2}$
24	6	7	192	156	132	108	84
25	6	$10\frac{1}{4}$	200	$162\frac{1}{2}$	$137\frac{1}{2}$	$112\frac{1}{2}$	$87\frac{1}{2}$
List Price in Cents per Square Foot			41	42	46	50	57

10490-0892 TCF

ROYAL UNION—STEAM or WATER

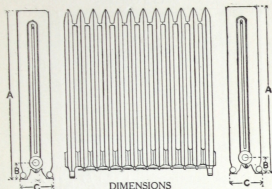


A Height of Radiator	44	38	30	24	18
H Height of Top Tapping .	41 $\frac{1}{8}$	35 $\frac{7}{8}$	27 $\frac{1}{2}$	21 $\frac{1}{4}$	15 $\frac{1}{4}$
B Height of Regular Tapping	4 $\frac{5}{8}$ inches				
C Width of Section	8 $\frac{5}{8}$ "				

LIST OF SIZES

Number of Sections	Total Length		RADIATING SURFACE (Square Feet)				
			44 in. High	38 in. High	30 in. High	24 in. High	18 in. High
3	0	10	18	15	12	9	6
4	1	1	24	20	16	12	8
5	1	4	30	25	20	15	10
6	1	7	36	30	24	18	12
7	1	10	42	35	28	21	14
8	2	1	48	40	32	24	16
9	2	4	54	45	36	27	18
10	2	7	60	50	40	30	20
11	2	10	66	55	44	33	22
12	3	1	72	60	48	36	24
13	3	4	78	65	52	39	26
14	3	7	84	70	56	42	28
15	3	10	90	75	60	45	30
16	4	1	96	80	64	48	32
17	4	4	102	85	68	51	34
18	4	7	108	90	72	54	36
19	4	10	114	95	76	57	38
20	5	1	120	100	80	60	40
21	5	4	126	105	84	63	42
22	5	7	132	110	88	66	44
23	5	10	138	115	92	69	46
24	6	1	144	120	96	72	48
25	6	4	150	125	100	75	50
List Price in Cents per Square Foot			41	42	46	50	58

SCEPTER—STEAM ONLY



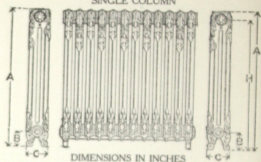
- A** Height of Radiator (See table below)
B Height of Regular Tapping 5 inches
C Width of Section 7 "

LIST OF SIZES

Number of Sections	Total Length		RADIATING SURFACE (Square Feet)				
	Feet	Inches	44 in. High	38 in. High	30 in. High	24 in. High	18 in. High
3	0	8 3/4	14 3/4	12	9	7	5
4	0	10 1/2	19	16	12	9 1/2	6 3/4
5	1	1 3/4	23 3/4	20	15	11 3/4	8 3/4
6	1	3 3/4	28 3/4	24	18	14	10
7	1	5 3/4	33 3/4	28	21	16 3/4	11 3/4
8	1	8	38	32	24	18 3/4	13 3/4
9	1	10 3/4	42 3/4	36	27	21	15
10	2	3/4	47 1/2	40	30	23 3/4	16 3/4
11	2	3 3/4	52 1/4	44	33	25 3/4	18 3/4
12	2	5 3/4	57	48	36	28	20
13	2	7 3/4	61 3/4	52	39	30 3/4	21 3/4
14	2	10 3/4	66 3/4	56	42	32 3/4	23 3/4
15	3	3/4	71 3/4	60	45	35	25
16	3	3	76	64	48	37 3/4	26 3/4
17	3	5 3/4	80 3/4	68	51	39 3/4	28 3/4
18	3	7 3/4	85 3/4	72	54	42	30
19	3	10 3/4	90 3/4	76	57	44 3/4	31 3/4
20	4	1/4	95	80	60	46 3/4	33 3/4
21	4	2 3/4	99 3/4	84	63	49	35
22	4	5 3/4	104 3/4	88	66	51 3/4	36 3/4
23	4	7 3/4	109 3/4	92	69	53 3/4	38 3/4
24	4	10	114	96	72	56	40
25	5	3/4	118 3/4	100	75	58 3/4	41 3/4
List Price in Cents per Square Foot			41	42	46	50	58

CORONET—STEAM and WATER

SINGLE COLUMN



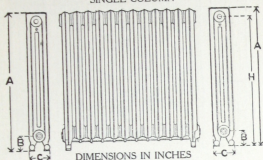
DIMENSIONS IN INCHES

A	Height of Radiator.....	45	37	31	25	19
H	Height of Top Tapping..	43 $\frac{1}{2}$	34 $\frac{1}{2}$	28 $\frac{1}{2}$	23 $\frac{1}{2}$	17 $\frac{1}{2}$
B	Height of Regular Tapping.....	4 $\frac{3}{4}$ inches				
C	Width of Section.....	5 $\frac{1}{4}$ "				

LIST OF SIZES

Number of Sections	Total Length Feet Inches		RADIATING SURFACE (Square Feet)				
			45 in. High	37 in. High	31 in. High	25 in. High	19 in. High
3	0	10	13 $\frac{1}{4}$	10 $\frac{1}{4}$	9	7 $\frac{1}{4}$	6
4	1	1	18	14	12	10	8
5	1	4	22 $\frac{1}{4}$	17 $\frac{1}{4}$	15	12 $\frac{1}{4}$	10
6	1	7	27	21	18	15	12
7	1	10	31 $\frac{1}{4}$	24 $\frac{1}{4}$	21	17 $\frac{1}{4}$	14
8	2	1	36	28	24	20	16
9	2	4	40 $\frac{1}{4}$	31 $\frac{1}{4}$	27	22 $\frac{1}{4}$	18
10	2	7	45	35	30	25	20
11	2	10	49 $\frac{1}{4}$	38 $\frac{1}{4}$	33	27 $\frac{1}{4}$	22
12	3	1	54	42	36	30	24
13	3	4	58 $\frac{1}{4}$	45 $\frac{1}{4}$	39	32 $\frac{1}{4}$	26
14	3	7	63	49	42	35	28
15	3	10	67 $\frac{1}{4}$	52 $\frac{1}{4}$	45	37 $\frac{1}{4}$	30
16	4	1	72	56	48	40	32
17	4	4	76 $\frac{1}{4}$	59 $\frac{1}{4}$	51	42 $\frac{1}{4}$	34
18	4	7	81	63	54	45	36
19	4	10	85 $\frac{1}{4}$	66 $\frac{1}{4}$	57	47 $\frac{1}{4}$	38
20	5	1	90	70	60	50	40
21	5	4	94 $\frac{1}{4}$	73 $\frac{1}{4}$	63	52 $\frac{1}{4}$	42
22	5	7	99	77	66	55	44
23	5	10	103 $\frac{1}{4}$	80 $\frac{1}{4}$	69	57 $\frac{1}{4}$	46
24	6	1	108	84	72	60	48
25	6	4	112 $\frac{1}{4}$	87 $\frac{1}{4}$	75	62 $\frac{1}{4}$	50
List Price in Cents per Square Foot			41	42	46	50	57

DIADEM—STEAM and WATER SINGLE COLUMN



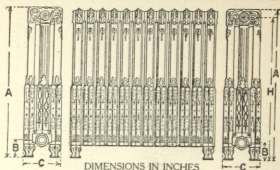
DIMENSIONS IN INCHES

A Height of Radiator	45	37	31	25	19
H Height of Top Tapping..	43 $\frac{3}{8}$	34 $\frac{1}{8}$	28 $\frac{1}{8}$	23 $\frac{1}{8}$	17 $\frac{1}{8}$
B Height of Regular Tapping.....	4 $\frac{5}{8}$ inches				
C Width of Section	5 $\frac{1}{4}$ "				

LIST OF SIZES

Number of Sections	Total Length Feet Inches		RADIATING SURFACE (Square Feet)				
			45 in. High	37 in. High	31 in. High	25 in. High	19 in. High
3	0	10	13 $\frac{1}{2}$	10 $\frac{1}{2}$	9	7 $\frac{1}{2}$	6
4	1	1	18	14	12	10	8
5	1	4	22 $\frac{1}{2}$	17 $\frac{1}{2}$	15	12 $\frac{1}{2}$	10
6	1	7	27	21	18	15	12
7	1	10	31 $\frac{1}{2}$	24 $\frac{1}{2}$	21	17 $\frac{1}{2}$	14
8	2	1	36	28	24	20	16
9	2	4	40 $\frac{1}{2}$	31 $\frac{1}{2}$	27	22 $\frac{1}{2}$	18
10	2	7	45	35	30	25	20
11	2	10	49 $\frac{1}{2}$	38 $\frac{1}{2}$	33	27 $\frac{1}{2}$	22
12	3	1	54	42	36	30	24
13	3	4	58 $\frac{1}{2}$	45 $\frac{1}{2}$	39	32 $\frac{1}{2}$	26
14	3	7	63	49	42	35	28
15	3	10	67 $\frac{1}{2}$	52 $\frac{1}{2}$	45	37 $\frac{1}{2}$	30
16	4	1	72	56	48	40	32
17	4	4	76 $\frac{1}{2}$	59 $\frac{1}{2}$	51	42 $\frac{1}{2}$	34
18	4	7	81	63	54	45	36
19	4	10	85 $\frac{1}{2}$	66 $\frac{1}{2}$	57	47 $\frac{1}{2}$	38
20	5	1	90	70	60	50	40
21	5	4	94 $\frac{1}{2}$	73 $\frac{1}{2}$	63	52 $\frac{1}{2}$	42
22	5	7	99	77	66	55	44
23	5	10	103 $\frac{1}{2}$	80 $\frac{1}{2}$	69	57 $\frac{1}{2}$	46
24	6	1	108	84	72	60	48
25	6	4	112 $\frac{1}{2}$	87 $\frac{1}{2}$	75	62 $\frac{1}{2}$	50
List Price in Cents per Square Feet			41	42	46	50	57

SOVEREIGN UNION—STEAM or WATER



A	Height of Radiator.....	37	31	25
H	Height of Top Tapping. . .	35½	29½	23½
B	Height of Regular Tapping.....	5 inches		
C	Width of Section....	8½ "		

LIST OF SIZES

Number of Sections	Total Length		RADIATING SURFACE (Square Feet)		
	Feet	Inches	37 in. High	31 in. High	25 in. High
3	0	9½	18	15	12
4	0	11¾	24	20	16
5	1	2½	30	25	20
6	1	5½	36	30	24
7	1	7½	42	35	28
8	1	10½	48	40	32
9	2	1½	54	45	36
10	2	3¾	60	50	40
11	2	6½	66	55	44
12	2	9¼	72	60	48
13	2	11½	78	65	52
14	3	2¾	84	70	56
15	3	5½	90	75	60
16	3	8	96	80	64
17	3	10½	102	85	68
18	4	1¾	108	90	72
19	4	4½	114	95	76
20	4	6¾	120	100	80
21	4	9½	126	105	84
22	5	1¾	132	110	88
23	5	2½	138	115	92
24	5	5½	144	120	96
25	5	8½	150	125	100
List Price in Cents per Square Foot			42	46	50

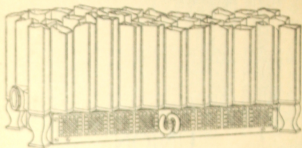
UNION
DAMPER BASE

FOR

SOVEREIGN RADIATOR ONLY

THE H. B. SMITH CO.

UNION DAMPER BASE
FOR SOVEREIGN RADIATOR ONLY



12-Section Radiator
10-Section (Full Length) Base

SPECIAL NOTICE

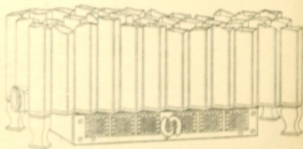
Radiators 21 sections and longer have center leg.

When center leg is used, Base cannot extend the full length of Radiator.

When Radiator longer than 20 sections is required to have Base under center of Radiator, specify on order that Radiator is to have two center legs, giving the distance (in sections) between center legs.

Specify on order (in sections) length of Base.

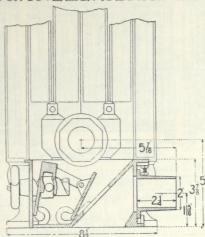
Each Radiator Section is 24 inches in length.



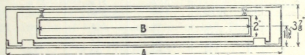
12-Section Radiator
8-Section Base

THE H. B. SMITH CO.

UNION DAMPER BASE FOR SOVEREIGN RADIATOR ONLY



Showing Construction and Method of Operation



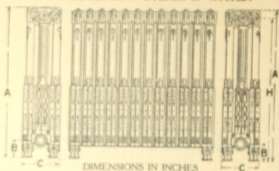
Rear View

DIMENSIONS

Length of Base in number of Sovereign Sections	A Length of Base	B Length of Thimble	Price
4	10 1/4"	6 1/2"	\$2.50
5	13"	6 1/2"	3.00
6	15 3/4"	9 1/2"	3.50
7	18 3/4"	11 1/2"	4.00
8	21"	14 1/2"	4.50
9	23 3/4"	17"	5.00
10	26 3/4"	19 1/2"	5.50
11	29"	19 1/2"	6.00
12	31 3/4"	19 1/2"	6.50
13	34 1/2"	19 1/2"	7.00
14	37 1/4"	19 1/2"	7.50
15	39 3/4"	19 1/2"	8.00
16	42 1/2"	19 1/2"	8.50
17	45 1/4"	19 1/2"	9.00
18	47 3/4"	19 1/2"	9.50

THE H. B. SMITH CO.

SOVEREIGN—STEAM or WATER

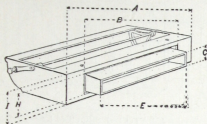


A	Height of Radiator.....	37	31	25
H	Height of Top Tapping. . .	35½	29½	23½
B	Height of Regular Tapping.....	5 inches		
C	Width of Section.....	8½ "		

LIST OF SIZES

Number of Sections	Total Length		RADIATING SURFACE (Square Feet)		
	Feet	Inches	37 in. High	31 in. High	25 in. High
3	0	9½	18	15	12
4	0	11¾	24	20	16
5	1	2½	30	25	20
6	1	5¼	36	30	24
7	1	7¾	42	35	28
8	1	10¼	48	40	32
9	2	1½	54	45	36
10	2	3¼	60	50	40
11	2	6½	66	55	44
12	2	9¼	72	60	48
13	2	11¾	78	65	52
14	3	2¼	84	70	56
15	3	5½	90	75	60
16	3	8	96	80	64
17	3	10¼	102	85	68
18	4	1¼	108	90	72
19	4	4½	114	95	76
20	4	6¾	120	100	80
21	4	9½	126	105	84
22	5	1¼	132	110	88
23	5	2¾	138	115	92
24	5	5¼	144	120	96
25	5	8½	150	125	100
List Price in Cents per Square Foot			42	46	50

DETACHED BASE AND DAMPER



Rear of Base

Air Inlet through back

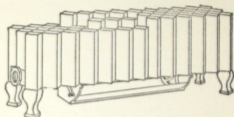
Damper open to admit outside air

LIST OF SIZES

- A** Length of Base.
B Length of back opening to receive Thimble.
C Height of Thimble (2 inches).
D Length of Base in number of Sovereign Union Sections.
E Length of Thimble.
H Height of back opening to receive Thimble ($2\frac{1}{2}$ inches).
I Height of Base ($3\frac{3}{8}$ inches).

D	A	B	E	Price
4 Sections	$9\frac{1}{2}"$	$7\frac{1}{4}"$	$6\frac{3}{8}"$	\$2.50
5 "	$13\frac{1}{2}"$	$8\frac{1}{8}"$	$6\frac{1}{2}"$	3.00
6 "	16"	$10\frac{1}{4}"$	$9\frac{1}{4}"$	3.50
7 "	$18\frac{3}{8}"$	$13\frac{3}{8}"$	$11\frac{1}{8}"$	4.00
8 "	$21\frac{1}{8}"$	$15\frac{1}{8}"$	$14\frac{1}{8}"$	4.50
9 "	$24\frac{1}{8}"$	$18\frac{1}{8}"$	17"	5.00
10 "	$26\frac{1}{8}"$	$21\frac{1}{8}"$	$19\frac{1}{8}"$	5.50
11 "	$29\frac{1}{2}"$	$23\frac{5}{8}"$	$22\frac{1}{8}"$	6.00
12 "	$31\frac{3}{8}"$	$26\frac{3}{8}"$	$25\frac{1}{8}"$	6.50
13 "	$34\frac{7}{8}"$	$28\frac{7}{8}"$	$27\frac{3}{8}"$	7.00
14 "	$37\frac{1}{2}"$	$31\frac{1}{2}"$	$30\frac{1}{8}"$	7.50
15 "	40"	$34\frac{1}{8}"$	$32\frac{3}{4}"$	8.00
16 "	$43\frac{1}{8}"$	$37\frac{1}{4}"$	$35\frac{1}{8}"$	8.50
17 "	$45\frac{1}{2}"$	$39\frac{1}{2}"$	$37\frac{3}{8}"$	9.00
18 "	$48\frac{3}{4}"$	$39\frac{1}{2}"$	$37\frac{3}{8}"$	9.50

DETACHED BASE AND DAMPER



13 SECTION RADIATOR—7 SECTION BASE ($18\frac{5}{8}$ " long)
Handle for operating at end of Base

SPECIAL NOTICE

DETACHED BASE AND DAMPER IS USED WITH
SOVEREIGN UNION RADIATOR ONLY

Radiators 21 Sections and longer have center leg.

When center leg is used, Base with Damper cannot extend the full length of Radiator.

When Radiator longer than 20 Sections is required to have Base with Damper under center of Radiator, specify on order that Radiator is to have two center legs, giving the distance (in Sections) between center legs.

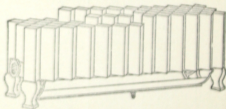
When Base extends full distance between legs the Damper is operated by Handle (ring) placed at center of Damper.

When Base does not extend full length between legs the Damper is operated by Handle at end of Base.

Unless otherwise specified, Bases will be shipped with air inlet at back and Handle at end.

Specify on order (in Sections "D") length of Base. (See page 9.)

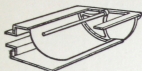
Each Radiator Section is $2\frac{1}{4}$ " in length.



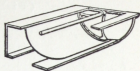
BASE FULL LENGTH OF RADIATOR

13 section Radiator—11 section Base ($29\frac{1}{8}$ " long). Handle for operating at center of Damper

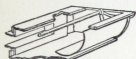
DETACHED BASE AND DAMPER



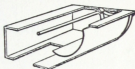
Damper closed to admit
air from room



Damper closed to admit
outside air



Damper open to admit
air from room



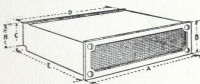
Damper open to admit
outside air

AIR INLET THROUGH
BACK

AIR INLET THROUGH
FLOOR

Unless otherwise specified, Base will be shipped with
air inlet through back.

WALL BOX

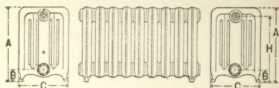


DIMENSIONS IN INCHES

SIZES	A	B	C	D	E	H	Price
2"x12"	13	3	2 $\frac{7}{16}$	12 $\frac{1}{2}$	9	1 $\frac{7}{8}$	\$2.00
2"x16"	17	3	2 $\frac{7}{16}$	16 $\frac{1}{2}$	9	1 $\frac{7}{8}$	\$2.50
2"x20"	20 $\frac{7}{8}$	3	2 $\frac{7}{16}$	20 $\frac{3}{8}$	9	1 $\frac{7}{8}$	\$3.00

FIVE-COLUMN PRINCESS

(Window Radiator)



DIMENSIONS IN INCHES

A	Height of Radiator.....	16	14	12
H	Height of Top Tapping...	14	12	10
B	Height of Regular Tapping.....	3 inches		
C	Width of Section.....	12 "		

LIST OF SIZES

Number of Sections	Total Length		RADIATING SURFACE (Square Feet)			
	Feet	Inches	12 in. High	14 in. High	16 in. High	18 in. High
3	0	10 1/4	10	12	14	16
4	1	2	13 1/2	16	18 1/2	21
5	1	5 1/4	16 1/2	20	23 1/2	26
6	1	8 1/4	20	24	28	32
7	1	11 1/4	23 1/2	28	32 1/2	37 1/2
8	2	3	26 1/2	32	37 1/2	42
9	2	6 1/4	30	36	42	48
10	2	9 1/4	33 1/2	40	46 1/2	52
11	3	0 1/4	36 1/2	44	51 1/2	56
12	3	4 1/4	40	48	56	60
13	3	7 1/4	43 1/2	52	60 1/2	65 1/2
14	3	10 1/4	46 1/2	56	65 1/2	70
15	4	1 1/4	50	60	70	74 1/2
16	4	5	53 1/2	64	74 1/2	79 1/2
17	4	8 1/4	56 1/2	68	79 1/2	84
18	4	11 1/4	60	72	84	88 1/2
19	5	2 1/4	63 1/2	76	88 1/2	93 1/2
20	5	6	66 1/2	80	93 1/2	98
21	5	9 1/4	70	84	98	102 1/2
22	6	0 1/4	73 1/2	88	102 1/2	107 1/2
23	6	3 1/4	76 1/2	92	107 1/2	112
24	6	7	80	96	112	116 1/2
25	6	10 1/4	83 1/2	100	116 1/2	121
List Price in Cents per Square Foot			68 60	64	60 68	64

Two Column
IMPERIAL AND
PRINCESS

Five Column
PRINCESS

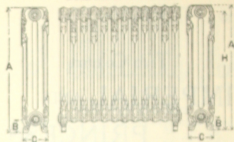
RADIATORS

NOTICE

These Radiators will be ready for shipment
about July 1st, 1907

THE H. B. SMITH CO.

TWO COLUMN IMPERIAL STEAM or WATER



DIMENSIONS IN INCHES

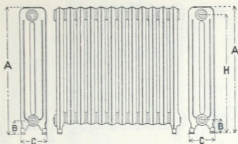
A	Height of Radiator.....	45	37	31	25	19
H	Height of Top Tapping..	43 $\frac{1}{8}$	35 $\frac{1}{8}$	29 $\frac{1}{8}$	23 $\frac{1}{8}$	17 $\frac{1}{8}$
B	Height of Regular Tapping	4 $\frac{1}{8}$ inches				
C	Width of Section.....	7 "				

LIST OF SIZES

Number of Sections	Total Length		RADIATING SURFACE (Square Feet)				
			45 in. High	37 in. High	31 in. High	25 in. High	19 in. High
3	0	10	15	12	10 $\frac{1}{4}$	9	6 $\frac{3}{4}$
4	1	1	20	16	14	12	9
5	1	4	25	20	17 $\frac{1}{4}$	15	11 $\frac{1}{4}$
6	1	7	30	24	21	18	13 $\frac{1}{4}$
7	1	10	35	28	24 $\frac{1}{4}$	21	15 $\frac{1}{4}$
8	2	1	40	32	28	24	18
9	2	4	45	36	31 $\frac{1}{4}$	27	20 $\frac{1}{4}$
10	2	7	50	40	35	30	22 $\frac{1}{4}$
11	2	10	55	44	38 $\frac{1}{4}$	33	24 $\frac{1}{4}$
12	3	1	60	48	42	36	27
13	3	4	65	52	45 $\frac{1}{4}$	39	29 $\frac{1}{4}$
14	3	7	70	56	49	42	31 $\frac{1}{4}$
15	3	10	75	60	52 $\frac{1}{4}$	45	33 $\frac{1}{4}$
16	4	1	80	64	56	48	36
17	4	4	85	68	59 $\frac{1}{4}$	51	38 $\frac{1}{4}$
18	4	7	90	72	63	54	40 $\frac{1}{4}$
19	4	10	95	76	66 $\frac{1}{4}$	57	42 $\frac{1}{4}$
20	5	1	100	80	70	60	45
21	5	4	105	84	73 $\frac{1}{4}$	63	47 $\frac{1}{4}$
22	5	7	110	88	77	66	49 $\frac{1}{4}$
23	5	10	115	92	80 $\frac{1}{4}$	69	51 $\frac{1}{4}$
24	6	1	120	96	84	72	54
25	6	4	125	100	87 $\frac{1}{4}$	75	56 $\frac{1}{4}$
List Price in Cents per Square Foot			41	42	46	50	57

THE H. B. SMITH CO.

TWO COLUMN PRINCESS STEAM or WATER



DIMENSIONS IN INCHES

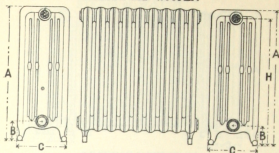
A	Height of Radiator	45	37	31	25	19
H	Height of Top Tapping	43 $\frac{1}{8}$	35 $\frac{1}{8}$	29 $\frac{1}{8}$	23 $\frac{1}{8}$	17 $\frac{1}{8}$
B	Height of Regular Tapping	4 $\frac{5}{8}$ inches				
C	Width of Section	7 "				

LIST OF SIZES

Number of Sections	Total Length		RADIATING SURFACE (Square Feet)				
	Feet	Inches	45 in. High	37 in. High	31 in. High	25 in. High	19 in. High
3	0	10	15	12	10 $\frac{3}{4}$	9	6 $\frac{3}{4}$
4	1	1	20	16	14	12	9
5	1	4	25	20	17 $\frac{3}{4}$	15	11 $\frac{3}{4}$
6	1	7	30	24	21	18	13 $\frac{3}{4}$
7	1	10	35	28	24 $\frac{3}{4}$	21	15 $\frac{3}{4}$
8	2	1	40	32	28	24	18
9	2	4	45	36	31 $\frac{3}{4}$	27	20 $\frac{3}{4}$
10	2	7	50	40	35	30	22 $\frac{3}{4}$
11	2	10	55	44	38 $\frac{3}{4}$	33	24 $\frac{3}{4}$
12	3	1	60	48	42	36	27
13	3	4	65	52	45 $\frac{3}{4}$	39	29 $\frac{3}{4}$
14	3	7	70	56	49	42	31 $\frac{3}{4}$
15	3	10	75	60	52 $\frac{3}{4}$	45	33 $\frac{3}{4}$
16	4	1	80	64	56	48	36
17	4	4	85	68	59 $\frac{3}{4}$	51	38 $\frac{3}{4}$
18	4	7	90	72	63	54	40 $\frac{3}{4}$
19	4	10	95	76	66 $\frac{3}{4}$	57	42 $\frac{3}{4}$
20	5	1	100	80	70	60	45
21	5	4	105	84	73 $\frac{3}{4}$	63	47 $\frac{3}{4}$
22	5	7	110	88	77	66	49 $\frac{3}{4}$
23	5	10	115	92	80 $\frac{3}{4}$	69	51 $\frac{3}{4}$
24	6	1	120	96	84	72	54
25	6	4	125	100	87 $\frac{3}{4}$	75	56 $\frac{3}{4}$
List Price in Cents per Square Foot			41	42	46	50	57

THE H. B. SMITH CO.

FIVE COLUMN PRINCESS STEAM and WATER



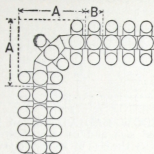
DIMENSIONS IN INCHES

A Height of Radiator	37	25
H Height of Top Tapping..	35	23
B Height of Regular Tapping.....	4 5/8 inches	
C Width of Section	12 "	

LIST OF SIZES

Number of Sections	Total Length	RADIATING SURFACE (Square Feet)	
	Feet	Inches	
3	0	10 3/4	
4	1	2	30
5	1	5 1/4	40
6	1	8 1/2	50
7	1	11 3/4	60
8	2	3	70
9	2	6 1/4	80
10	2	9 1/2	90
11	3	3/4	100
12	3	4	110
13	3	7 1/4	120
14	3	10 3/4	130
15	4	1 3/4	140
16	4	5	150
17	4	8 1/4	160
18	4	11 3/4	170
19	5	2 3/4	180
20	5	6	190
21	5	9 1/4	200
22	6	3 1/2	210
23	6	3 3/4	220
24	6	7	230
25	6	10 3/4	240
			250
List Price in Cents per Square Foot			42
			50

CORNER RADIATOR



If the total number of sections in CORNER RADIATOR is odd (9, 11, 13, 15, etc.), each arm of the Radiator can be made of the same length. If, however, the Radiator contains an even number of Sections (8, 10, 12, 14, etc.), one arm must be longer than the other, in which case it is necessary to send a sketch, showing which arm is to contain the extra section, also which end is to be used for supply and which end for return.

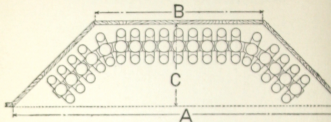
Corner Radiators are made only in the styles indicated below:

DIMENSIONS

STYLE	A	B
Imperial Union.....	12 $\frac{5}{8}$ "	3 $\frac{1}{4}$ "
Princess Union.....		
Royal Union.....	12"	3"
Coronet.....	9 $\frac{3}{4}$ "	3"
Diadem.....		

PRICE: Add \$3.00 NET per Radiator to regular price

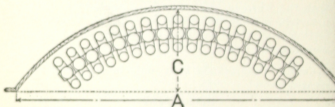
BAY WINDOW RADIATOR



BAY WINDOW RADIATORS can be assembled in any desired size and on any desired angle. In ordering, specify the size of Radiator required (either in number of sections, or in square feet of surface), and the dimensions "A," "B," and "C."

PRICE: Add \$6.00 NET per Radiator to regular price
(—\$3.00 NET for each angle)

CURVED RADIATOR



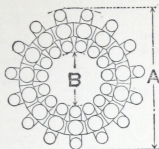
CURVED RADIATORS can be assembled in any desired size or on any desired radius. In ordering, specify the size of Radiator required (either in number of sections or in square feet of surface), and the dimensions "A" and "C."

PRICE: Add \$0.60 NET per Section to regular price

Bay Window and Curved Radiators are made only in the following styles:

Single Column Radiators:	CORONET AND DIADEM.
Three Column Radiators:	IMPERIAL UNION,
	PRINCESS UNION AND ROYAL UNION.
Five Column Radiator:	FIVE COLUMN PRINCESS.

CIRCULAR RADIATOR



CIRCULAR RADIATORS can be assembled as one whole Radiator, or they can be assembled in halves for the purpose of encircling columns.

When Circular Radiators are in halves, each half becomes an independent Radiator. In ordering specify which method of assembling is desired.

Circular Radiators are made only in the styles and sizes indicated below:

DIMENSIONS IN INCHES

Number of Sections	IMPERIAL UNION and PRINCESS UNION		CORONET and DIADEM	
	A Outside Diameter	B Inside Diameter	A Outside Diameter	B Inside Diameter
9	24 1/4 In.	4 1/4 In.	18 1/4 In.	6 1/4 In.
12	27 " "	7 " "	20 3/4 " "	8 3/4 " "
15	29 " "	9 " "	22 3/4 " "	10 3/4 " "
18	30 1/2 " "	10 1/2 " "	24 3/4 " "	12 1/4 " "
20	32 3/4 " "	12 3/4 " "	25 3/4 " "	13 3/4 " "
24	35 1/4 " "	15 1/4 " "	28 " "	15 1/2 " "
30	40 1/4 " "	20 1/4 " "	32 1/4 " "	20 1/4 " "
36	44 1/4 " "	24 1/4 " "	35 1/4 " "	22 3/4 " "
40	47 1/2 " "	27 1/2 " "	39 1/4 " "	26 3/4 " "
45	51 1/4 " "	31 1/2 " "	43 1/4 " "	30 3/4 " "

PRICE: Add \$0.60 NET per Section to regular price

RADIATOR CONCEALED BRACKETS

For
Imperial Union
Princess Union
Royal Union
Coronet and
Diadem Radiators



Top Bracket

Price for Imperial, Princess and
Royal Union, \$0.25 NET

Price for Coronet and Diadem
\$0.12½ NET



Bottom Bracket

Price for Imperial, Princess and
Royal Union, \$0.25 NET

Price for Coronet and Diadem
\$0.12½ NET

For
Scepter
Radiators
only



Top Bracket

Price \$0.12½ NET



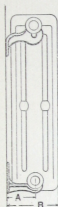
Bottom Bracket

Price \$0.12½ NET

DIMENSIONS IN INCHES

STYLE OF BRACKET	A	B	C	D	E	H	N	K
Imperial Union, Princess Union and Royal Union	5½	6½	½	4	4	5½	½	5½
Coronet and Diadem....	3½	5½	000	3	3	4	¾	3½

RADIATOR CONCEALED BRACKETS IN POSITION



For Imperial Union, Princess
Union and Royal Union
Radiators

A— $5\frac{1}{2}$ inches

B—10 inches

For Coronet and Diadem
Radiators

A— $3\frac{1}{2}$ inches

B— $6\frac{1}{2}$ inches

For Scepter
Radiator

A— $4\frac{1}{2}$ inches

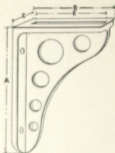
B— $7\frac{1}{2}$ inches

SOLID HIGH LEGS

In ordering Radiators with extra high legs, specify the amount in inches to be added to the regular leg.

PRICE for extra high Legs: Add \$0.40 NET per
LEG Section to regular price

RADIATOR BRACKETS



WALL BRACKET

DIMENSIONS

For Imperial Union and
Princess Union Radiators

A—16 inches

B—11 inches

C—4 inches

E—9 inches

Price \$2.00

For Coronet and
Diadem Radiators

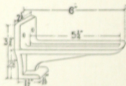
A—10 inches

B—6½ inches

C—3½ inches

E—5½ inches

Price \$1.00



BASEBOARD BRACKET

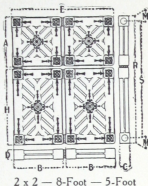
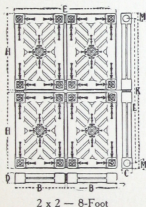
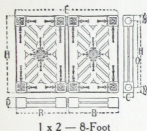
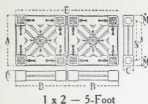
For Coronet and Diadem Radiators only

Price \$0.50

X-RAY WALL RADIATOR

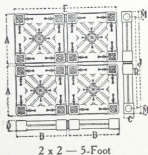
STEAM OR WATER

DIMENSIONS IN INCHES



A—14 ⁵/₈"
 B—14 ⁵/₈"
 C—31 ⁵/₈"
 D—3 ⁵/₈"
 E—29 ⁵/₈"
 H—21 ⁵/₈"
 J—29 ⁵/₈"
 K—44 ⁵/₈"

L—41 ⁵/₈"
 M—1 ⁵/₈"
 N—11 ⁵/₈"
 O—18 ⁵/₈"
 R—36 ⁵/₈"
 S—33 ⁵/₈"
 T—26 ⁵/₈"



X-RAY WALL RADIATOR

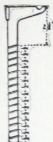
LIST OF SIZES

Number of Sections		5-FOOT X-RAY		8-FOOT X-RAY	
Height	Length	Sq. Feet of Surface	Length Feet Inches	Sq. Feet of Surface	Length Feet Inches
1 x 1		5	1— 2 $\frac{5}{8}$	8	1— 2 $\frac{5}{8}$
1 x 2		10	2— 5 $\frac{3}{8}$	16	2— 5 $\frac{3}{8}$
1 x 3		15	3— 8 $\frac{1}{8}$	24	3— 8 $\frac{1}{8}$
1 x 4		20	4— 11 $\frac{1}{2}$	32	4— 11 $\frac{1}{2}$
1 x 5		25	6— 2 $\frac{3}{8}$	40	6— 2 $\frac{3}{8}$
1 x 6		30	7— 5 $\frac{5}{8}$	48	7— 5 $\frac{5}{8}$
1 x 7		35	8— 8 $\frac{1}{4}$	56	8— 8 $\frac{1}{4}$
1 x 8		40	9— 11 $\frac{3}{4}$	64	9— 11 $\frac{3}{4}$
		Height 1 ft. 2 $\frac{5}{16}$ in.		Height 1 ft. 9 $\frac{1}{4}$ in.	
2 x 1		10	1— 2 $\frac{5}{8}$	16	1— 2 $\frac{5}{8}$
2 x 2		20	2— 5 $\frac{3}{8}$	32	2— 5 $\frac{3}{8}$
2 x 3		30	3— 8 $\frac{1}{8}$	48	3— 8 $\frac{1}{8}$
2 x 4		40	4— 11 $\frac{1}{2}$	64	4— 11 $\frac{1}{2}$
2 x 5		50	6— 2 $\frac{3}{8}$	80	6— 2 $\frac{3}{8}$
2 x 6		60	7— 5 $\frac{5}{8}$	96	7— 5 $\frac{5}{8}$
2 x 7		70	8— 8 $\frac{1}{4}$	112	8— 8 $\frac{1}{4}$
2 x 8		80	9— 11 $\frac{3}{4}$	128	9— 11 $\frac{3}{4}$
		Height 2 ft. 5 $\frac{3}{8}$ in.		Height 3 ft. 8 $\frac{1}{4}$ in.	
3 x 1		15	1— 2 $\frac{5}{8}$	24	1— 2 $\frac{5}{8}$
3 x 2		30	2— 5 $\frac{3}{8}$	48	2— 5 $\frac{3}{8}$
3 x 3		45	3— 8 $\frac{1}{8}$	72	3— 8 $\frac{1}{8}$
3 x 4		60	4— 11 $\frac{1}{2}$	96	4— 11 $\frac{1}{2}$
3 x 5		75	6— 2 $\frac{3}{8}$	120	6— 2 $\frac{3}{8}$
3 x 6		90	7— 5 $\frac{5}{8}$	144	7— 5 $\frac{5}{8}$
3 x 7		105	8— 8 $\frac{1}{4}$	168	8— 8 $\frac{1}{4}$
3 x 8		120	9— 11 $\frac{3}{4}$	192	9— 11 $\frac{3}{4}$
		Height 3 ft. 8 $\frac{1}{8}$ in.		Height 5 ft. 6 $\frac{3}{4}$ in.	

8-FOOT SECTION Radiators, longer than one section are NOT tapped to be used HORIZONTALLY,

PRICE: 5-foot and 8-foot X-Ray
\$0.42 per square foot

X-RAY WALL RADIATOR LEGS AND BRACKETS

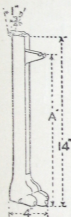


REDUCIBLE BRACKET

Used with No. 1 and
No. 2 X-Ray Bracket

A—12½ inches

but can be reduced to 5
inches by cutting off the
Reducible Bracket



No. 1

Price \$0.60
Complete



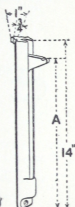
No. 3

Price \$0.20
Complete



No. 4

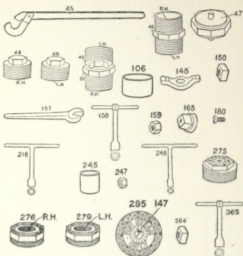
Price \$0.20
Complete



No. 2

Price \$0.55
Complete

DIRECT RADIATOR FITTINGS



PRICE LIST

No.	Name	Size	NET Price	No.	Name	Size	NET Price
45	X-Ray Wrench		\$3.00	180	Imperial Rosette Screw		\$.00½
46	R. and L. Nipple	1½"	.10	218	Wrench for Nut No. 159	½" Hex.	1.25
47	Disk		.05	245	Sovereign Top Nipple		.02½
48	R. H. Male Plug	1½"	.05	247	Sovereign Nut	½" Hex.	.00½
49	L. H. Male Plug	1½"	.05	248	Wrench for Nut No. 247	½" Hex.	.75
50	R. H. Female Plug	1½"	.05	275	Radiator Plug	2"	.05
106	Push Nipple		.02½	276	Radiator Bushing R. H.	2"	.05
148	Yoke		.02½	279	Radiator Bushing L. H.	2"	.05
150	Nut	½" Sq.	.00½	295	Royal Rosette		.02½
157	Wrench for Nut No. 159	½" Hex.	.50	364	Nut	½" Sq.	.00½
158	Wrench for Nut No. 150	½" Sq.	1.25	365	Wrench for Nut No. 364	½" Sq.	1.25
159	Nut	½" Hex.	.00½				
165	Royal Steam Nut	½" Sq.	.02½				

*Catalog number of part.

DIRECT RADIATORS — REGULAR TAPPING

STEAM

TWO-PIPE WORK

Radiators will be tapped for two-pipe work unless otherwise specified.

Radiators of 50 square feet and smaller	1" x $\frac{3}{4}$ "
Radiators larger than 50 square feet.....	1 $\frac{1}{4}$ " x 1"
Air Valve.....	$\frac{1}{8}$ "

ONE-PIPE WORK

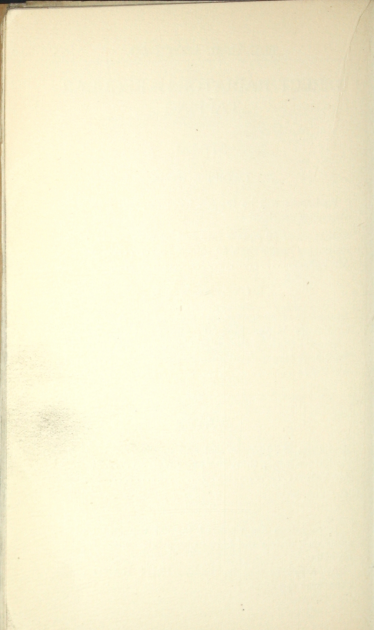
Radiators of 30 square feet and smaller	1"
Radiators larger than 30 square feet and smaller than 60 square feet.....	1 $\frac{1}{4}$ "
Radiators larger than 60 square feet.....	1 $\frac{1}{2}$ "
Air Valve.....	$\frac{1}{8}$ "

WATER

Radiators of 50 square feet and smaller.....	1" x 1"
Radiators larger than 50 square feet.....	1 $\frac{1}{4}$ " x 1 $\frac{1}{4}$ "
Air Valve.....	$\frac{1}{8}$ " at top

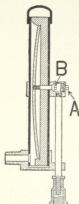
If radiators are required tapped top and bottom, same end, or top and bottom, opposite ends, so specify on order.

All tappings will be made RIGHT HAND unless otherwise specified.



BRECKENRIDGE'S
AUTOMATIC
AIR
VALVES

AUTOMATIC AIR VALVES



Sectional View

The cut opposite illustrates a sectional view of the No. 4 Valve, but also shows the Mechanical Construction of all Breckenridge Automatic Air Valves.

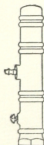
TO SET VALVE

Remove the plug and unscrew the valve so that the steam will flow out freely. After the valve has become thoroughly heated close it lightly until the flow of steam stops (do not close the valve too hard on its seat), then screw in the plug and the valve will require no further attention.

These directions apply to all of the valves except No. 1, which is to be set with thumb screw instead of with key.

Keys are furnished with valves.

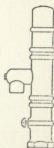
FOR INDIRECT RADIATORS



No. 1 Valve

Cast Iron—Finished Black
 $\frac{3}{8}$ " Connection

Price \$0.70



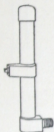
No. 2 Valve

Cast Iron—Finished Black
 $\frac{3}{8}$ " Connection, $\frac{1}{2}$ " Drip

Price \$0.80

AUTOMATIC AIR VALVES

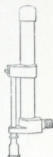
FOR DIRECT RADIATORS



No. 3 Valve

Brass—Nickel Plated
 $\frac{1}{8}$ " Connection

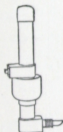
Price \$1.00



No. 4 Valve

Brass—Nickel Plated
 $\frac{1}{8}$ " Connection $\frac{1}{8}$ " Drip

Price \$1.25



No. 5 Valve

Brass—Nickel Plated
 $\frac{1}{8}$ " Connection

Price \$1.25



No. 6 Valve

Brass—Nickel Plated
 $\frac{1}{8}$ " Connection $\frac{1}{8}$ " Drip

Price \$1.25

AUTOMATIC AIR VALVES

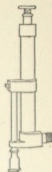
FOR DIRECT RADIATORS



No. 7 Valve

Brass—Nickel Plated
 $\frac{1}{2}$ " Connection

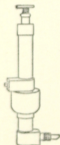
Price \$1.25



No. 8 Valve

Brass—Nickel Plated
 $\frac{1}{2}$ " Connection $\frac{1}{8}$ " Drip

Price \$1.50



No. 9 Valve

Brass—Nickel Plated
 $\frac{1}{2}$ " Connection

Price \$1.50



No. 6 Elbow

Brass—Nickel Plated
Used with No. 6 Valve

Price \$0.25



No. 7 Elbow

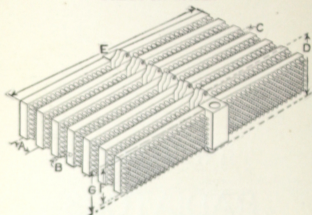
Brass—Nickel Plated
Used with No. 7 Valve

Price \$0.25

INDIRECT
RADIATORS

REGULAR PATTERN GOLD PIN

STEAM OR WATER



10 Square Feet per Section

DIMENSIONS OF SECTION

A	Distance from center to center.....	$3\frac{1}{4}"$
B	Distance between ends of Pins.....	$\frac{3}{4}"$
C	Length of Pin.....	$\frac{3}{4}"$
D	Height of Flange.....	$10\frac{3}{8}"$
E	Length of Section.....	$40\frac{1}{8}"$
F	Height of Section at end.....	$6\frac{1}{8}"$
G	Height of Section at center.....	$7\frac{3}{4}"$

Shipping weight, per Section, 70 lbs.

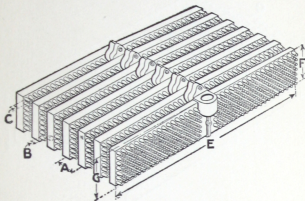
REGULAR TAPPING

Supply.....	$1\frac{1}{4}"$	Return.....	$1\frac{1}{4}"$
Air Valve.....	$\frac{3}{8}"$		

Price \$0.27 per Square Foot

TEN-INCH FLANGE GOLD PIN

STEAM OR WATER



15 Square Feet per Section

DIMENSIONS OF SECTION

A	Distance from center to center.....	$3\frac{1}{4}"$
B	Distance between ends of Pins	$\frac{1}{4}"$
C	Length of Pin.....	$\frac{3}{4}"$
E	Length of Section.....	$40\frac{1}{2}"$
F	Height of Section at end.....	$10\frac{1}{4}"$
G	Height of Section at center.....	$10\frac{3}{4}"$

Shipping weight, per Section, 108 lbs.

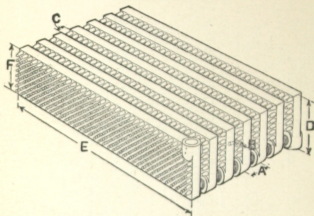
REGULAR TAPPING

Supply.....	$1\frac{1}{2}"$	Return.....	$1\frac{1}{2}"$
Air Valve.....	$\frac{3}{8}"$		

Price \$0.27 per Square Foot

12-FOOT R. & L. NIPPLE GOLD PIN

STEAM ONLY



12 Square Feet per Section

DIMENSIONS OF SECTION

A	Distance from center to center.....	3 $\frac{1}{4}$ "
B	Distance between ends of Pins.....	$\frac{1}{4}$ "
C	Length of Pin.....	$\frac{3}{4}$ "
D	Height of Section.....	9"
E	Length of Section.....	36"
F	Height of Section.....	8 $\frac{1}{2}$ "
	Size of Right and Left Nipple.....	2"

Shipping weight, per Section, 62 lbs.

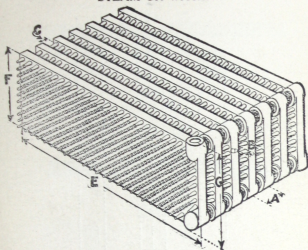
Supply or Head Section is tapped L. H. for R. & L. Nipple
 Return or Drain Section is tapped R. H. for R. & L. Nipple

REGULAR TAPPING

Supply.....	1 $\frac{1}{4}$ "	Return.....	1 $\frac{1}{4}$ "
Air Valve.....	$\frac{3}{8}$ "		

Price \$0.27 per Square Foot

RIGHT AND LEFT NIPPLE GOLD PIN STEAM OR WATER



15-FOOT R. & L. NIPPLE GOLD PIN

F	Height of Section.....	10"
G	Height of Section.....	11 1/2"
Shipping weight, per Section, 77 lbs.		
15 Square Feet per Section		

20-FOOT R. & L. NIPPLE GOLD PIN

F	Height of Section.....	14"
G	Height of Section.....	15 1/2"
Shipping weight, per Section, 106 lbs.		
20 Square Feet per Section		

DIMENSIONS COMMON TO BOTH

A	Distance from center to center.....	3 1/4"
B	Distance between ends of Pins.....	3/4"
C	Length of Pin.....	3/4"
E	Length of Section.....	36"
Size of R. & L. Nipple.....		2"

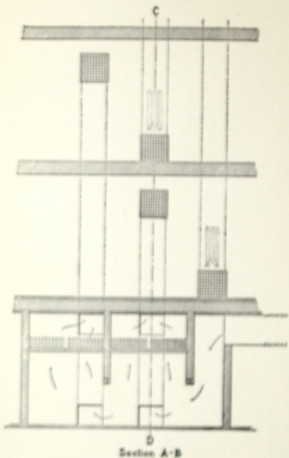
REGULAR TAPPING

Supply.....	1 1/2"	Return.....	1 1/2"
Air Valves.....		3/8"	

Supply or Head Section is tapped L. H. for R. & L. Nipple
Return or Drain Section is tapped R. H. for R. & L. Nipple

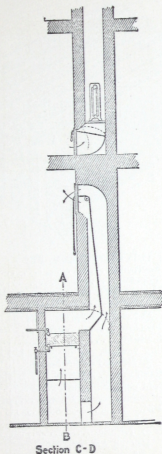
Price \$0.27 per Square Foot

SCHOOL PIN



As used for warming and ventilating schoolhouses

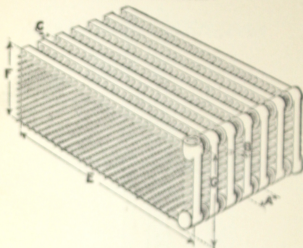
SCHOOL PIN



As used for warming and ventilating schoolhouses

SCHOOL PIN

STEAM OR WATER



15-FOOT SCHOOL PIN

F	Height of Section.....	10'
G	Height of Section.....	11 1/2'

Shipping weight, per Section, 82 lbs.

15 Square Feet per Section

20-FOOT SCHOOL PIN

F	Height of Section.....	14'
G	Height of Section.....	15 1/2'

Shipping weight, per Section, 115 lbs.

20 Square Feet per Section

DIMENSIONS COMMON TO BOTH

A	Distance from center to center.....	4'
B	Distance between ends of Pins.....	3 1/2'
C	Length of Pin.....	1'
E	Length of Section.....	30'
	Size of R. & L. Nipple.....	2"

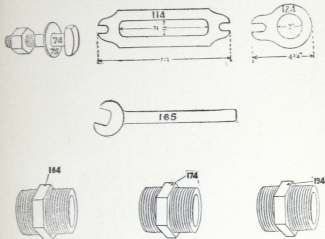
REGULAR TAPPING

Supply.....	2"	Return.....	2"
	Air Valve.....		3/4"

Supply or Head Section is tapped L. H. for R. & L. Nipple
 Return or Drain Section is tapped R. H. for R. & L. Nipple

Price \$0.27 per Square Foot

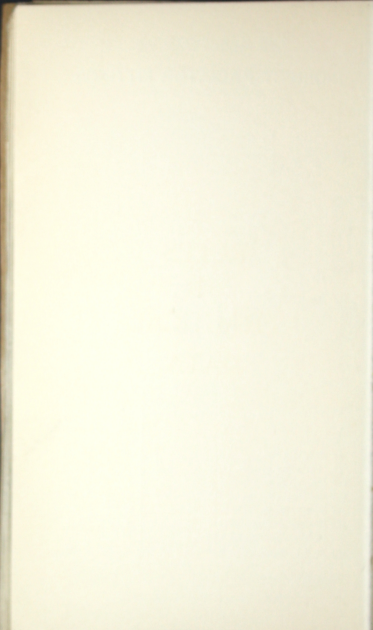
INDIRECT RADIATOR FITTINGS



PRICE LIST

No.*	Name	Size	NET Price
74	Bolt with Nut.....		\$.02½
75	Washer for Bolt No. 74.....		.00½
114	Regular Pattern (paper) Gasket.....		.01
124	10" Flange Pin (paper) Gasket.....		.01
164	R. & L. Nipple for 12-foot Gold Pin.....	2" Hex.	.15
165	Wrench for Nipple No. 164.....	2" Hex.	1.25
174	R. & L. Nipple for School Pin.....	2" Hex.	.15
194	R. & L. Nipple for 15 & 20-foot Gold Pin	2" Hex.	.15

*Catalog number of part.



RULES
AND
PRACTICAL
DATA

TABLE OF NET PRICES

Figured at Different Discounts for the Several Heights of Radiators

Discount	45" and 44"	38" and 37"	31" and 30"	25" and 24"	19"
	41c	42c	46c	50c	57c
25	\$.3075	\$.315	\$.345	\$.375	\$.4275
26	.3034	.3108	.3404	.37	.4218
27	.2993	.3066	.3358	.365	.4161
28	.2952	.3024	.3312	.36	.4104
29	.2911	.2982	.3266	.355	.4047
30	.287	.294	.322	.35	.399
31	.2829	.2898	.3174	.345	.3933
32	.2788	.2856	.3128	.34	.3876
33	.2747	.2814	.3082	.335	.3819
34	.2706	.2772	.3036	.33	.3762
35	.2665	.273	.299	.325	.3705
36	.2624	.2688	.2944	.32	.3648
37	.2583	.2646	.2898	.315	.3591
38	.2542	.2604	.2852	.31	.3534
39	.2501	.2562	.2806	.305	.3477
40	.246	.252	.276	.30	.342
41	.2419	.2478	.2714	.295	.3363
42	.2378	.2436	.2668	.29	.3306
43	.2337	.2394	.2622	.285	.3249
44	.2296	.2352	.2576	.28	.3192
45	.2255	.231	.253	.275	.3135
46	.2214	.2268	.2484	.27	.3078
47	.2173	.2226	.2438	.265	.3021
48	.2132	.2184	.2392	.26	.2964
49	.2091	.2142	.2346	.255	.2907
50	.205	.21	.23	.25	.285
51	.2009	.2058	.2254	.245	.2793
52	.1968	.2016	.2208	.24	.2736
53	.1927	.1974	.2162	.235	.2679
54	.1886	.1932	.2116	.23	.2622
55	.1845	.189	.207	.225	.2565
56	.1804	.1848	.2024	.22	.2508
57	.1763	.1806	.1978	.215	.2451
58	.1722	.1764	.1932	.21	.2394
59	.1681	.1722	.1886	.205	.2337
60	.164	.168	.184	.20	.228
61	.1599	.1638	.1794	.195	.2223
62	.1558	.1596	.1748	.19	.2166
63	.1517	.1554	.1702	.185	.2109
64	.1476	.1512	.1656	.18	.2052
65	.1435	.147	.161	.175	.1995
66	.1394	.1428	.1564	.17	.1938
67	.1353	.1386	.1518	.165	.1881
68	.1312	.1344	.1472	.16	.1824
69	.1271	.1302	.1426	.155	.1767
70	.123	.126	.138	.15	.171
71	.1189	.1218	.1334	.145	.1653
72	.1148	.1176	.1288	.14	.1596
73	.1107	.1134	.1242	.135	.1539
74	.1066	.1092	.1196	.13	.1482
75	.1025	.105	.115	.125	.1425

TABLE OF NET PRICES

Figured at Different Discounts for the Several Heights of Radiators

Discount	18"	16"	14"	12"	Indirects
	58c	60c	64c	68c	27c
25	\$.435	\$.45	\$.48	\$.51	\$.2025
26	.4292	.444	.4736	.5032	.1998
27	.4234	.438	.4672	.4964	.1971
28	.4176	.432	.4608	.4896	.1944
29	.4118	.426	.4544	.4828	.1917
30	.406	.42	.448	.476	.189
31	.4002	.414	.4416	.4692	.1863
32	.3944	.408	.4352	.4624	.1836
33	.3886	.402	.4288	.4556	.1809
34	.3828	.396	.4224	.4488	.1782
35	.377	.39	.416	.442	.1755
36	.3712	.384	.4096	.4352	.1728
37	.3654	.378	.4032	.4284	.1701
38	.3596	.372	.3968	.4216	.1674
39	.3538	.366	.3904	.4148	.1647
40	.348	.36	.384	.408	.162
41	.3422	.354	.3776	.4012	.1593
42	.3364	.348	.3712	.3944	.1566
43	.3306	.342	.3648	.3876	.1539
44	.3248	.336	.3584	.3808	.1512
45	.319	.33	.352	.374	.1485
46	.3132	.324	.3456	.3672	.1458
47	.3074	.318	.3392	.3604	.1431
48	.3016	.312	.3328	.3536	.1404
49	.2958	.306	.3264	.3468	.1377
50	.29	.30	.32	.34	.135
51	.2842	.294	.3136	.3332	.1323
52	.2784	.288	.3072	.3264	.1296
53	.2726	.282	.3008	.3196	.1269
54	.2668	.276	.2944	.3128	.1242
55	.261	.27	.288	.306	.1215
56	.2552	.264	.2816	.2992	.1188
57	.2494	.258	.2752	.2924	.1161
58	.2436	.252	.2688	.2856	.1134
59	.2378	.246	.2624	.2788	.1107
60	.232	.24	.256	.272	.108
61	.2262	.234	.2496	.2652	.1053
62	.2204	.228	.2432	.2584	.1026
63	.2146	.222	.2368	.2516	.0999
64	.2088	.216	.2304	.2448	.0972
65	.203	.21	.224	.238	.0945
66	.1972	.204	.2176	.2312	.0918
67	.1914	.198	.2112	.2244	.0891
68	.1856	.192	.2048	.2176	.0864
69	.1798	.186	.1984	.2108	.0837
70	.174	.18	.192	.204	.081
71	.1682	.174	.1856	.1972	.0783
72	.1624	.168	.1792	.1904	.0756
73	.1566	.162	.1728	.1836	.0729
74	.1508	.156	.1664	.1768	.0702
75	.145	.15	.16	.17	.0675

WEIGHTS AND MEASURES

MEASURE OF LENGTH

4.	In.	make	1 Hand.	3	Feet	make	1 Yard.
7.92	In.	"	1 Link.	5 $\frac{1}{4}$	Yds.	"	1 Rod or Pole.
18.	In.	"	1 Cubit.	40	Poles	"	1 Furlong.
12.	In.	"	1 Foot.	8	Fur.	"	1 Mile.
6.	Ft.	"	1 Fathom.	69 $\frac{1}{2}$	Miles	"	1 Degree.
1 Degree contains 60 Geographical Miles.							
1760 Yards, $\frac{1}{2}$ 1 Mile.							
5280 Feet, $\frac{1}{2}$							

MEASURE OF SURFACE

144	Square Inches	make	1 Square Foot.
9	Square Feet	"	1 Square Yard.
30 $\frac{1}{4}$	Square Yards	"	1 Rod, Perch or Pole.
40	Square Rods	"	1 Rood.
4	Roods	"	1 Acre.
10	Square Chains	"	1 Acre.
640	Acres	"	1 Square Mile.
Gunter's Chain equal to 22 Yards or 100 Links.			
272 $\frac{1}{4}$	Square Feet	make	1 Square Rod.
43,560	Square Feet	make	1 Acre.

MEASURE OF SOLIDITY

1728	Cubic Inches	make	1 Cubic Foot.
27	Cubic Feet	"	1 Cubic Yard.

AVOIRDUPOIS WEIGHT

27 $\frac{1}{2}$	Grains	make	1 Drachm (dr.)
16	Drachms	"	1 Ounce (oz.) or 473 $\frac{1}{4}$ Grains.
16	Ounces	"	1 Pound (lb.) or 7000 Grains.
25	Pounds	"	1 Quarter (qr.)
4	Quarters	"	1 Hundred-Weight (cwt.)
20	Cwts.	"	1 Ton.
2240	Pounds	"	1 Gross Ton.

LIQUID MEASURE

4	Gills	make	1 Pint.	31 $\frac{1}{4}$	Gallons	make	1 Barrel.
2	Pints	"	1 Quart.	54	Gallons	"	1 Hhd.
4	Quarts	"	1 Gallon.				

DRY MEASURE

8	Quarts	make	1 Peck.	8	Bushels	make	1 Quarter.
4	Pecks	"	1 Bushel.	36	Bushels	"	1 Chaldron.

METRIC SYSTEM

MEASURES OF LENGTH

METRIC DENOMINATIONS.		EQUIVALENTS.
Myriameter,	10,000 Meters.	6.2137 miles.
Kilometer,	1,000 "	0.62137 "
Hektometer,	100 "	328.092 feet.
Dekameter,	10 "	32.809 "
Meter,	1 "	3.2809 "
Decimeter,	1-10 "	3.937 inches
Centimeter,	1-100 "	0.3937 "
Millimeter,	1-1000 "	0.03937 "

MEASURES OF SURFACE

METRIC DENOMINATIONS.		EQUIVALENTS.
Hectars,	10,000 Square Meters.	2.471 Acres.
Are,	100 "	119.6 Square Yards.
Centare,	1 "	10.7643 Square Feet.

MEASURES OF CAPACITY

METRIC DENOMINATIONS.	EQUIVALENTS.	
	DRY MEASURE.	WINE MEASURE.
Kiloliter,	1,000 Liters.	1.308 Cubic Yards.
Hektoliter,	100 "	264.17 Gallons
Dekaliter,	10 "	2.6417 "
Liter,	1 "	1.0567 Quarts.
Deciliter,	1-10 "	0.845 Gill.
Centiliter,	1-100 "	.338 Fluid Oz.
Milliliter,	1-1000 "	.27 " Dr.

WEIGHTS

METRIC DENOMINATIONS.	EQUIVALENTS.	
	AVOIRDUPOIS WT.	QUANTITY OF WATER.
Millier,	1,000,000 Grams.	2204.6 Lbs.
Quintal,	100,000 "	220.46 "
Myriagram,	10,000 "	22.046 "
Kilogram,	1,000 "	2.2046 "
Hektogram,	100 "	3.5274 Ozs.
Dekagram,	10 "	.3527 "
Gram,	1 "	15.432 Grs.
Decigram,	1-10 "	1.5432 "
Centigram,	1-100 "	.1543 "
Milligram,	1-1000 "	.0154 "

AREAS AND CIRCUMFERENCES OF CIRCLES

Diam.	Circum.	Area	Diam.	Circum.	Area
. $\frac{1}{4}$	.7854	.04909	19.	59.6904	283.529
. $\frac{1}{2}$	1.5708	.19635	. $\frac{1}{4}$	61.2612	298.648
. $\frac{3}{4}$	2.3562	.44178	20.	62.832	314.16
1.	3.1416	.7854	. $\frac{1}{2}$	64.4028	330.064
. $\frac{1}{2}$	4.7124	1.7671	21.	65.9736	346.361
2.	6.2832	3.1416	. $\frac{3}{4}$	67.5444	363.051
. $\frac{1}{2}$	7.854	4.9087	22.	69.1152	380.134
3.	9.4248	7.0686	. $\frac{1}{2}$	70.686	397.608
. $\frac{1}{2}$	10.9956	9.6211	23.	72.2568	415.477
4.	12.5664	12.5664	. $\frac{1}{2}$	73.8276	433.731
. $\frac{1}{2}$	14.1372	15.9043	24.	75.3984	452.39
5.	15.708	19.635	. $\frac{1}{2}$	76.9692	471.436
. $\frac{1}{2}$	17.2788	23.7583	25.	78.54	490.875
6.	18.8496	28.2744	. $\frac{1}{2}$	80.1108	510.706
. $\frac{1}{2}$	20.4204	33.1831	26.	81.6816	530.93
7.	21.9912	38.4846	. $\frac{1}{2}$	83.2524	551.547
. $\frac{1}{2}$	23.562	44.1787	27.	84.8232	572.557
8.	25.1328	50.2656	. $\frac{1}{2}$	86.394	593.958
. $\frac{1}{2}$	26.7036	56.7451	28.	87.9648	615.754
9.	28.2744	63.6174	. $\frac{1}{2}$	89.5356	637.941
. $\frac{1}{2}$	29.8452	70.8823	29.	91.1064	660.521
10.	31.416	78.54	. $\frac{1}{2}$	92.6772	683.494
. $\frac{1}{2}$	32.9868	86.59	30.	94.248	706.86
11.	34.5576	95.0334	. $\frac{1}{2}$	95.8188	730.618
. $\frac{1}{2}$	36.1284	103.8691	31.	97.3896	754.769
12.	37.6992	113.098	. $\frac{1}{2}$	98.9604	779.313
. $\frac{1}{2}$	39.27	122.718	32.	100.5312	804.25
13.	40.8408	132.733	. $\frac{1}{2}$	102.102	829.578
. $\frac{1}{2}$	42.4116	143.139	33.	103.673	855.301
14.	43.9824	153.938	. $\frac{1}{2}$	105.244	881.415
. $\frac{1}{2}$	45.5532	165.13	34.	106.814	907.922
15.	47.124	176.715	. $\frac{1}{2}$	108.385	934.822
. $\frac{1}{2}$	48.6948	188.692	35.	109.956	962.115
16.	50.2656	201.062	. $\frac{1}{2}$	111.527	989.8
. $\frac{1}{2}$	51.8364	213.825	36.	113.098	1017.878
17.	53.4072	226.981	. $\frac{1}{2}$	114.668	1046.349
. $\frac{1}{2}$	54.978	240.528	37.	116.239	1075.213
18.	56.5488	254.467	. $\frac{1}{2}$	117.81	1104.469
. $\frac{1}{2}$	58.1196	268.803	38.	119.381	1134.118

AREAS AND CIRCUMFERENCES OF CIRCLES

Diam.	Circum.	Area	Diam.	Circum.	Area
38. $\frac{3}{4}$	120.952	1164.159	57.	179.071	2551.76
39.	122.522	1194.593	57. $\frac{1}{4}$	180.642	2596.73
39. $\frac{1}{4}$	124.093	1225.42	58.	182.213	2642.09
40.	125.664	1256.64	58. $\frac{1}{4}$	183.784	2687.84
40. $\frac{1}{4}$	127.235	1288.25	59.	185.354	2733.98
41.	128.806	1320.26	59. $\frac{1}{4}$	186.925	2780.51
41. $\frac{1}{4}$	130.376	1352.65	60.	188.496	2827.44
42.	131.947	1385.44	60. $\frac{1}{4}$	190.067	2874.76
42. $\frac{1}{4}$	133.518	1418.63	61.	191.638	2922.47
43.	135.089	1452.21	61. $\frac{1}{4}$	193.208	2970.58
43. $\frac{1}{4}$	136.66	1486.17	62.	194.779	3019.08
44.	138.23	1520.53	62. $\frac{1}{4}$	196.35	3067.97
44. $\frac{1}{4}$	139.801	1555.28	63.	197.921	3117.25
45.	141.372	1590.43	63. $\frac{1}{4}$	199.492	3166.93
45. $\frac{1}{4}$	142.943	1625.97	64.	201.062	3217.
46.	144.514	1661.91	64. $\frac{1}{4}$	202.633	3267.46
46. $\frac{1}{4}$	146.084	1698.23	65.	204.204	3318.31
47.	147.655	1734.95	65. $\frac{1}{4}$	205.775	3369.56
47. $\frac{1}{4}$	149.226	1772.05	66.	207.346	3421.2
48.	150.797	1809.56	66. $\frac{1}{4}$	208.916	3473.24
48. $\frac{1}{4}$	152.368	1847.45	67.	210.487	3525.66
49.	153.938	1885.74	67. $\frac{1}{4}$	212.058	3578.48
49. $\frac{1}{4}$	155.509	1924.42	68.	213.629	3631.69
50.	157.08	1963.5	68. $\frac{1}{4}$	215.2	3685.29
50. $\frac{1}{4}$	158.651	2002.97	69.	216.77	3739.29
51.	160.222	2042.82	69. $\frac{1}{4}$	218.341	3793.68
51. $\frac{1}{4}$	161.792	2083.08	70.	219.912	3848.46
52.	163.363	2123.72	70. $\frac{1}{4}$	221.483	3903.63
52. $\frac{1}{4}$	164.934	2164.76	71.	223.054	3959.2
53.	166.505	2206.19	71. $\frac{1}{4}$	224.624	4015.16
53. $\frac{1}{4}$	168.076	2248.01	72.	226.195	4071.51
54.	169.646	2290.23	72. $\frac{1}{4}$	227.766	4128.26
54. $\frac{1}{4}$	171.217	2332.83	73.	229.337	4185.4
55.	172.788	2375.83	73. $\frac{1}{4}$	230.908	4242.93
55. $\frac{1}{4}$	174.359	2419.22	74.	232.478	4300.85
56.	175.93	2463.01	74. $\frac{1}{4}$	234.049	4359.17
56. $\frac{1}{4}$	177.5	2507.19	75.	235.62	4417.87

RELATIVE PROPORTIONS OF A WARMING APPARATUS

Sq. Feet of Heating Surface	Sq. Feet of Grate Surface	Size of Flue, Square Inches	Sq. Feet of Radia- tion	SURFACE TO CONTENTS		
				1:50	1:70	1:90
67	3.5	96	400	20,000	28,000	36,000
83	4	96	500	25,000	35,000	45,000
116	5.8	96	700	35,000	49,000	63,000
167	8.3	110	1,000	50,000	70,000	90,000
250	12.5	150	1,500	75,000	105,000	135,000
333	16.5	195	2,000	100,000	140,000	180,000
416	15.5	248	2,500	125,000	175,000	225,000
500	18.6	300	3,000	150,000	210,000	270,000
584	21.6	348	3,500	175,000	245,000	315,000
666	24.5	398	4,000	200,000	280,000	360,000
750	27.5	445	4,500	225,000	315,000	405,000
834	26	485	5,000	250,000	350,000	450,000
916	28.5	530	5,500	275,000	385,000	495,000
1,000	31	575	6,000	300,000	420,000	540,000
1,083	33.5	620	6,500	325,000	455,000	585,000
1,167	36	665	7,000	350,000	490,000	630,000
1,250	38.5	715	7,500	375,000	525,000	675,000
1,333	41	760	8,000	400,000	560,000	720,000
1,416	43.5	810	8,500	425,000	595,000	765,000
1,500	45.5	860	9,000	450,000	630,000	810,000
1,583	48	910	9,500	475,000	665,000	855,000
1,666	50	955	10,000	500,000	700,000	900,000

This table is intended to show the existing relations between the different parts of a plant for warming. It will be understood that the figures in the above are not intended to indicate a fixed and unvarying relation existing between any two parts, but are meant to approximate such proportions as will occur in an average job working under average conditions.

WROUGHT IRON WELDED PIPE

DIMENSIONS, WEIGHTS, ETC., OF STANDARD SIZES FOR STEAM, GAS, WATER, OIL, ETC.

Inside Diameter	Outside Diameter	External Circumference	Length of Pipe per Sq. Ft. of Outside Surface	Internal Area	External Area	Length of Pipe Containing One Cubic Foot	Weight per Foot of Length	No. of Threads per Inch of Screw	Contents in *Gallons per Foot	Weights of Water per Foot of Length
Inches	Inches	Inches	Feet	Inches	Inches	Feet	Lbs.			Lbs.
$\frac{1}{8}$	.40	1.272	9.44	.012	.129	2500.	.24	27	.0006	.005
$\frac{1}{4}$	.54	1.696	7.075	.049	.229	1385.	.42	18	.0026	.021
$\frac{3}{8}$	.67	2.121	5.657	.110	.358	751.5	.56	14	.0057	.047
$\frac{1}{2}$	.84	2.652	4.502	.196	.554	472.4	.84	14	.0102	.085
$\frac{3}{4}$	1.05	3.299	3.637	.441	.866	270.	1.12	11 $\frac{1}{2}$	.0230	.190
1	1.31	4.134	2.903	.785	1.357	166.9	1.67	11 $\frac{1}{2}$	.0408	.349
1 $\frac{1}{8}$	1.66	5.215	2.301	1.227	2.164	96.25	2.25	11 $\frac{1}{2}$	.0638	.527
1 $\frac{1}{2}$	1.9	5.969	2.01	1.767	2.835	70.65	2.69	11 $\frac{1}{2}$	.0918	.760
2	2.37	7.461	1.611	3.141	4.430	42.36	3.66	11 $\frac{1}{2}$	.1632	1.356
2 $\frac{1}{2}$	2.87	9.032	1.328	4.908	6.491	30.11	5.77	8	.2550	2.116
3	3.5	10.996	1.091	7.068	9.621	19.49	7.54	8	.3673	3.049
3 $\frac{1}{2}$	4.	12.566	.955	9.621	12.566	14.56	9.05	8	.4998	4.155
4	4.5	14.137	.849	12.566	15.904	11.31	10.72	8	.6528	5.405
4 $\frac{1}{2}$	5.	15.708	.765	15.904	19.635	9.03	12.49	8	.8263	6.851
5	5.56	17.475	.629	19.635	24.299	7.20	14.56	8	1.020	8.500
6	6.62	20.813	.577	28.274	34.471	4.98	18.76	8	1.469	12.312
7	7.62	23.954	.505	38.484	45.663	3.72	23.41	8	1.999	16.662
8	8.62	27.096	.444	50.265	58.426	2.88	28.34	8	2.611	21.750
9	9.68	30.433	.394	63.617	73.715	2.26	34.67	8	3.300	27.500
10	10.75	33.772	.355	78.540	90.792	1.80	40.64	8	4.081	34.000

*The Standard U. S. gallon of 231 cubic inches

TABLE OF EXPANSION OF WROUGHT IRON PIPE

Tempera- ture of the Air when the Pipe is fitted	Length of Pipe when fitted	LENGTH OF PIPE WHEN HEATED TO			
		215 Degrees	265 Degrees	297 Degrees	338 Degrees
Deg. Fahr.	Feet	Feet Inches	Feet Inches	Feet Inches	Feet Inches
0	100	100 1.72	100 2.12	100 2.31	100 2.70
32	100	100 1.47	100 1.78	100 2.12	100 2.45
64	100	100 1.21	100 1.61	100 1.87	100 2.19

REGISTERS

Size of Opening	Capacity in Sq. Inches	Size of Opening	Capacity in Sq. Inches	Size of Opening	Capacity in Sq. Inches
6 x 10..	....40	10 x 14..	.... 93	20 x 20..	....267
8 x 10..	....53	10 x 16..	....107	20 x 24..	....320
8 x 12—	—64	12 x 15—	—120	20 x 26—	—347
8 x 15..	....80	12 x 19..	....152	21 x 29..	....406
9 x 12..	....72	14 x 22..	....205	27 x 27..	....486
9 x 14—	—84	15 x 25—	—250	27 x 38—	—684
10 x 12..	....80	16 x 24..	....256	30 x 30..	....600

ROUND REGISTERS

Size of Opening	Capacity in Sq. Inches	Size of Opening	Capacity in Sq. Inches	Size of Opening	Capacity in Sq. Inches
7 in....	....26	12 in....	.... 75	20 in....	....209
8 "....	....33	14 "....	....103	24 "....	....301
9 "....	....42	16 "....	....134	30 "....	....471
10 "....	....52	18 "....	....169	36 "....	....679

IRON PIPE SIZES OF BRASS PIPE

Made to Correspond with Iron Tubes and Fit Iron Tube Fittings

LIST OF SIZES, LENGTHS, ETC.

OUTSIDE DIAMETER	SAME AS IRON SIZE	WEIGHT PER FOOT	
		Brass	Copper
13-32 In. =	1-8 In. =	.30 Pounds =	.31 Pounds.
9-16 " =	1-4 " =	.43 " =	.45 "
11-16 " =	3-8 " =	.58 " =	.61 "
13-16 " =	1-2 " =	.80 " =	.84 "
1 1-16 " =	3-4 " =	1.17 " =	1.23 "
1 5-16 " =	1 " =	1.67 " =	1.75 "
1 5-8 " =	1 1-4 " =	2.42 " =	2.54 "
1 7-8 " =	1 1-2 " =	2.92 " =	3.07 "
2 3-8 " =	2 " =	4.17 " =	4.38 "
2 7-8 " =	2 1-2 " =	5. " =	5.25 "
3 1-2 " =	3 " =	8. " =	8.40 "
4 " =	3 1-2 " =	10. " =	10.50 "
4 1-2 " =	4 " =	12. " =	12.00 "

TABLE OF DECIMAL EQUIVALENTS

Of 8ths, 16ths, 32nds and 64ths of an Inch

8ths	32nds	64ths	64ths
$\frac{1}{8}$ = .125	$\frac{1}{32}$ = .03125	$\frac{1}{64}$ = .015625	$\frac{1}{64}$ = .015625
$\frac{1}{4}$ = .250	$\frac{2}{32}$ = .0625	$\frac{2}{64}$ = .03125	$\frac{2}{64}$ = .03125
$\frac{3}{8}$ = .375	$\frac{3}{32}$ = .09375	$\frac{3}{64}$ = .046875	$\frac{3}{64}$ = .046875
$\frac{1}{2}$ = .500	$\frac{4}{32}$ = .125	$\frac{4}{64}$ = .0625	$\frac{4}{64}$ = .0625
$\frac{5}{8}$ = .625	$\frac{5}{32}$ = .15625	$\frac{5}{64}$ = .078125	$\frac{5}{64}$ = .078125
$\frac{3}{4}$ = .750	$\frac{6}{32}$ = .1875	$\frac{6}{64}$ = .09375	$\frac{6}{64}$ = .09375
$\frac{7}{8}$ = .875	$\frac{7}{32}$ = .21875	$\frac{7}{64}$ = .109375	$\frac{7}{64}$ = .109375
16ths	$\frac{8}{32}$ = .25	$\frac{8}{64}$ = .125	$\frac{8}{64}$ = .125
$\frac{1}{16}$ = .0625	$\frac{9}{32}$ = .28125	$\frac{9}{64}$ = .140625	$\frac{9}{64}$ = .140625
$\frac{1}{8}$ = .125	$\frac{10}{32}$ = .3125	$\frac{10}{64}$ = .15625	$\frac{10}{64}$ = .15625
$\frac{3}{16}$ = .1875	$\frac{11}{32}$ = .34375	$\frac{11}{64}$ = .171875	$\frac{11}{64}$ = .171875
$\frac{1}{4}$ = .25	$\frac{12}{32}$ = .375	$\frac{12}{64}$ = .1875	$\frac{12}{64}$ = .1875
$\frac{5}{16}$ = .3125	$\frac{13}{32}$ = .40625	$\frac{13}{64}$ = .203125	$\frac{13}{64}$ = .203125
$\frac{3}{8}$ = .375	$\frac{14}{32}$ = .4375	$\frac{14}{64}$ = .21875	$\frac{14}{64}$ = .21875
$\frac{1}{2}$ = .5	$\frac{15}{32}$ = .46875	$\frac{15}{64}$ = .234375	$\frac{15}{64}$ = .234375
$\frac{5}{8}$ = .625	$\frac{16}{32}$ = .5	$\frac{16}{64}$ = .25	$\frac{16}{64}$ = .25
$\frac{3}{4}$ = .75	$\frac{17}{32}$ = .53125	$\frac{17}{64}$ = .265625	$\frac{17}{64}$ = .265625
$\frac{7}{8}$ = .875	$\frac{18}{32}$ = .5625	$\frac{18}{64}$ = .28125	$\frac{18}{64}$ = .28125
1	$\frac{19}{32}$ = .59375	$\frac{19}{64}$ = .296875	$\frac{19}{64}$ = .296875
	$\frac{20}{32}$ = .625	$\frac{20}{64}$ = .3125	$\frac{20}{64}$ = .3125
	$\frac{21}{32}$ = .65625	$\frac{21}{64}$ = .328125	$\frac{21}{64}$ = .328125
	$\frac{22}{32}$ = .6875	$\frac{22}{64}$ = .34375	$\frac{22}{64}$ = .34375
	$\frac{23}{32}$ = .71875	$\frac{23}{64}$ = .359375	$\frac{23}{64}$ = .359375
	$\frac{24}{32}$ = .75	$\frac{24}{64}$ = .375	$\frac{24}{64}$ = .375
	$\frac{25}{32}$ = .78125	$\frac{25}{64}$ = .390625	$\frac{25}{64}$ = .390625
	$\frac{26}{32}$ = .8125	$\frac{26}{64}$ = .40625	$\frac{26}{64}$ = .40625
	$\frac{27}{32}$ = .84375	$\frac{27}{64}$ = .421875	$\frac{27}{64}$ = .421875
	$\frac{28}{32}$ = .875	$\frac{28}{64}$ = .4375	$\frac{28}{64}$ = .4375
	$\frac{29}{32}$ = .90625	$\frac{29}{64}$ = .453125	$\frac{29}{64}$ = .453125
	$\frac{30}{32}$ = .9375	$\frac{30}{64}$ = .46875	$\frac{30}{64}$ = .46875
		$\frac{31}{64}$ = .484375	$\frac{31}{64}$ = .484375

THE MOVEMENT OF WARM AIR IN FLUES

The power that causes the upward motion of heated air in flues, is relatively small, being merely the difference in weight between equal columns of air at different temperatures. The colder air forces the warmer column upward with a force proportionate to this difference in weight, and with a velocity equal to that acquired by a body falling through a space equal to the difference in height that would be occupied by two columns of equal weight but of different temperatures.

According to the known law of gravitation, the velocity will be approximately equal to eight (8) times the square root of the height of descent in decimals of a foot. The discharge of air under the above conditions, however, is subject to certain corrections for friction, etc., and in general practice a deduction of one fourth ($\frac{1}{4}$) is made to represent the true rate of discharge.

Opposite are two tables, the first showing the discharge of air from a flue one foot cross section and one foot high, for given differences in temperature, with corrections for friction. The second table shows the square root of different heights of flues, and is a multiplier for the first table. Combining the two tables to meet existing conditions the total discharge of air from any flue may be estimated.

For example: what is the discharge of air from a flue 15 feet high, with an area of 2 square feet, when the inside temperature is 72° and the outside temperature is 42° Fahrenheit? The difference of temperature between the air in the flue and that outside is 30° , and by reference to table No. 1, we find that the discharge of air from a flue 1 foot high, and 1 square foot cross section, for this difference in temperature is 88 cubic feet per minute. Multiplying this by 2 feet, the area of the flue in question, and by the square root of 15 (table No. 2) for the height, we get 681.12, which is the discharge per minute in cubic feet, under the above conditions.

*TABLE No. 1

The discharge of air per minute from a flue one square foot in section and one foot high at different temperatures

Excess of Temperature of Air in Flue over Outside Air

Temperature of Outside Air		5°	10°	15°	20°	25°	30°	35°	40°	45°	50°	55°	60°	65°	70°	75°
	0°	38	53	65	76	84	92	100	106	113	119	125	130	136	141	145
	12°	37	53	63	75	83	91	98	105	111	118	124	128	134	139	144
	22°	37	52	62	74	82	90	97	104	110	117	122	127	132	137	142
	32°	36	51	62	73	81	89	96	103	109	115	120	126	131	136	141
	42°	36	51	62	72	80	88	95	102	108	114	119	125	130	135	140
	52°	36	50	62	71	80	87	94	101	107	113	118	124	129	134	139
	62°	35	50	61	71	79	86	93	100	106	112	117	123	127	133	137
	72°	35	49	61	70	78	85	92	99	105	111	116	121	126	131	136
	82°	35	49	60	69	77	85	91	98	104	110	115	120	125	130	134
92°	34	48	60	69	77	84	90	97	103	109	114	119	124	128	133	
102°	34	48	59	68	76	83	90	96	102	108	113	118	123	127	131	

*TABLE No. 2

Square Roots of Heights of Flues. Multipliers for above Table

Column H=Height of Flue in Feet	H	\sqrt{H}	H	\sqrt{H}	H	\sqrt{H}	H	\sqrt{H}	H	\sqrt{H}	H	\sqrt{H}	H	\sqrt{H}	H	\sqrt{H}
	1	1	10	3.16	19	4.36	28	5.29	37	6.08	46	6.78	55	7.42	64	8
	2	1.41	11	3.32	20	4.47	29	5.39	38	6.16	47	6.86	56	7.48	65	8.06
	3	1.73	12	3.46	21	4.58	30	5.48	39	6.24	48	6.93	57	7.55	66	8.12
	4	2	13	3.61	22	4.69	31	5.57	40	6.32	49	7	58	7.62	67	8.19
	5	2.24	14	3.74	23	4.80	32	5.66	41	6.4	50	7.07	59	7.68	68	8.25
	6	2.45	15	3.87	24	4.90	33	5.74	42	6.48	51	7.14	60	7.75	69	8.31
	7	2.65	16	4	25	5	34	5.83	43	6.56	52	7.21	61	7.81	70	8.37
	8	2.83	17	4.12	26	5.10	35	5.92	44	6.63	53	7.28	62	7.87	71	8.43
	9	3	18	4.24	27	5.2	36	6	45	6.71	54	7.35	63	7.94	72	8.49

*Heat for the Warming and Ventilation of Buildings by J. H. Mills

TEMPERATURE AND VOLUME OF STEAM

at Different Pressures

PRESSURE IN POUNDS		Temperature in Fahrenheit Degrees	VOLUME	
By Steam Gauge	Above Vacuum		Compared with Water	Cubic Feet of Steam from 1 lb. of Water
0	15	212.0	1642	26.36
5	20	228.0	1299	19.72
10	25	240.1	996	15.99
15	30	250.4	838	13.46
20	35	259.3	726	11.65
25	40	267.3	640	10.27
30	45	274.4	572	9.18
35	50	281.0	518	8.31
40	55	287.1	474	7.61
45	60	292.7	437	7.01
50	65	298.0	405	6.49
55	70	302.9	378	6.07
60	75	307.5	353	5.68
65	80	312.0	333	5.35
70	85	316.1	314	5.05
75	90	320.2	298	4.79
80	95	324.1	283	4.55
85	100	327.9	270	4.33
90	105	331.3	257	4.14
95	110	334.6	247	3.97
100	115	338.0	237	3.80
110	125	344.2	219	3.51
120	135	350.1	203	3.27
130	145	355.6	190	3.06
140	155	361.0	179	2.87
150	165	366.0	169	2.71

Table of Temperature, Specific Gravity and Weight of Water;
also Pressure due to Different Heights in Feet

Temper- ature	Specific Gravity	Height in Feet	Pounds Pressure	Temper- ature	Specific Gravity	Height in Feet	Pounds Pressure
20	.99880	1	.43	132	.9850	90	39.00
30	.99962	2	.86	142	.9822	100	43.31
40	1.00000	5	2.16	152	.9792	110	47.63
42	.99997	10	4.33	162	.9761	120	51.97
52	.99950	15	6.49	172	.9729	130	56.29
62	.9986	20	8.66	182	.9694	140	60.63
72	.9974	25	10.82	192	.9659	150	64.96
82	.9959	40	17.32	202	.9622	160	69.11
92	.9941	50	21.65	212	.9585	170	73.46
102	.9921	60	25.80	230	.9513	180	77.95
112	.9900	70	30.15	250	.9430	190	82.81
122	.9875	80	34.65	275	.9321	200	96.62

HEAT UNITS IN WATER

Between 32° and 212° Fahrenheit, and Weight of Water
per Cubic Foot

Temperature Degrees F.	Heat Units	Weight in Pounds per Cubic Foot	Temperature Degrees F.	Heat Units	Weight in Pounds per Cubic Foot	Temperature Degrees F.	Heat Units	Weight in Pounds per Cubic Foot
32	0.	62.42	123	91.16	61.68	168	136.44	60.81
35	3.	62.42	124	92.17	61.67	169	137.45	60.79
40	8.	62.42	125	93.17	61.65	170	138.45	60.77
45	13.	62.42	126	94.17	61.63	171	139.46	60.75
50	18.	62.41	127	95.18	61.61	172	140.47	60.73
52	20.	62.40	128	96.18	61.60	173	141.48	60.70
54	22.01	62.40	129	97.19	61.58	174	142.49	60.68
56	24.01	62.39	130	98.19	61.56	175	143.50	60.66
58	26.01	62.38	131	99.20	61.54	176	144.51	60.64
60	28.01	62.37	132	100.20	61.52	177	145.52	60.62
62	30.01	62.36	133	101.21	61.51	178	146.52	60.59
64	32.01	62.35	134	102.21	61.49	179	147.53	60.57
66	34.02	62.34	135	103.22	61.47	180	148.54	60.55
68	36.02	62.33	136	104.22	61.45	181	149.55	60.53
70	38.02	62.31	137	105.23	61.43	182	150.56	60.50
72	40.02	62.30	138	106.23	61.41	183	151.57	60.48
74	42.03	62.28	139	107.24	61.39	184	152.58	60.46
76	44.03	62.27	140	108.25	61.37	185	153.59	60.44
78	46.03	62.25	141	109.25	61.36	186	154.60	60.41
80	48.04	62.23	142	110.26	61.34	187	155.61	60.39
82	50.04	62.21	143	111.26	61.32	188	156.62	60.37
84	52.04	62.19	144	112.27	61.30	189	157.63	60.34
86	54.05	62.17	145	113.28	61.28	190	158.64	60.32
88	56.05	62.15	146	114.28	61.26	191	159.65	60.29
90	58.06	62.13	147	115.29	61.24	192	160.67	60.27
92	60.06	62.11	148	116.29	61.22	193	161.68	60.25
94	62.06	62.09	149	117.30	61.20	194	162.69	60.22
96	64.07	62.07	150	118.31	61.18	195	163.70	60.20
98	66.07	62.05	151	119.31	61.16	196	164.71	60.17
100	68.08	62.02	152	120.32	61.14	197	165.72	60.15
102	70.09	62.00	153	121.33	61.12	198	166.73	60.12
104	72.09	61.97	154	122.33	61.10	199	167.74	60.10
106	74.10	61.95	155	123.34	61.08	200	168.75	60.07
108	76.10	61.92	156	124.35	61.06	201	169.77	60.05
110	78.11	61.89	157	125.35	61.04	202	170.78	60.02
112	80.12	61.86	158	126.36	61.02	203	171.79	60.00
114	82.13	61.83	159	127.37	61.00	204	172.80	59.97
115	83.13	61.82	160	128.37	60.98	205	173.81	59.95
116	84.13	61.80	161	129.38	60.96	206	174.83	59.92
117	85.14	61.78	162	130.39	60.94	207	175.84	59.89
118	86.14	61.77	163	131.40	60.92	208	176.85	59.87
119	87.15	61.75	164	132.41	60.90	209	177.86	59.84
120	88.15	61.74	165	133.41	60.87	210	178.87	59.82
121	89.15	61.72	166	134.42	60.85	211	179.89	59.79
122	90.16	61.70	167	135.43	60.83	212	180.90	59.76

VOLUME AND WEIGHT OF AIR

and Weight of Vapor in Saturated Air

Temperature	Volume	Number of Cubic Feet to 1 Pound	Weight of 1000 Cubic Feet Dry Air	Tension of Vapor	Weight of Vapor Saturated in 1000 Cubic Feet	Weight of Air Displaced by Vapor
0	0.9340	11.460	87.260	0.04379	0.07930	0.1264
5	0.9449	11.591	86.289	0.05747	0.10289	0.1646
10	0.9551	11.726	85.251	0.07116	0.12588	0.2014
15	0.9653	11.869	84.317	0.08535	0.14932	0.2389
20	0.9755	11.992	83.403	0.10748	0.18180	0.2909
25	0.9857	12.125	82.440	0.13367	0.22871	0.3661
30	0.9959	12.258	81.566	0.16581	0.27491	0.4398
32	1.0000	12.311	81.235	0.17989	0.29633	0.4741
36	1.0082	12.417	80.515	0.21066	0.35201	0.5632
40	1.0163	12.523	79.872	0.24604	0.40770	0.6523
44	1.0244	12.629	79.176	0.28647	0.47070	0.7531
48	1.0326	12.735	78.493	0.33284	0.54204	0.8672
52	1.0408	12.841	77.825	0.38574	0.62282	0.9965
56	1.0489	12.947	77.220	0.44352	0.71063	1.1370
60	1.0571	13.053	76.628	0.51683	0.82173	1.3147
64	1.0652	13.159	75.988	0.59229	0.93390	1.4943
68	1.0734	13.265	75.357	0.67994	1.0631	1.7008
72	1.0816	13.371	74.794	0.78018	1.21050	1.9368
76	1.0897	13.477	74.184	0.89103	1.31715	2.1076
80	1.0979	13.583	73.638	1.01669	1.5540	2.4864
84	1.1060	13.689	73.046	1.15705	1.7536	2.8058
88	1.1142	13.795	72.464	1.31554	1.9772	3.1635
92	1.1223	13.901	71.942	1.49067	2.2257	3.5611
96	1.1305	14.007	71.377	1.69214	2.5060	4.0096
100	1.1387	14.113	70.872	1.91937	2.8220	4.5152
104	1.1468	14.219	70.323	2.14669	3.133	5.0138
108	1.1550	14.325	69.784	2.43323	3.523	5.6368
112	1.1631	14.431	69.300	2.72984	3.926	6.2826
116	1.1713	14.537	68.776	3.05954	4.367	6.9882
120	1.1794	14.643	68.306	3.41728	4.843	7.7488
124	1.1876	14.749	67.797	3.81775	5.371	8.5940
128	1.1957	14.855	67.295	4.26073	6.088	9.7430
132	1.2039	14.961	66.845	4.72888	6.559	10.4950
136	1.2121	15.067	66.357	5.25807	7.240	11.584
140	1.2202	15.173	65.919	5.81736	7.957	12.731
144	1.2284	15.279	65.442	6.48029	8.800	14.048
148	1.2365	15.385	64.977	7.14323	9.630	15.408
152	1.2447	15.491	64.568	7.9104	10.595	16.952
156	1.2528	15.597	64.102	8.6923	11.566	18.506
160	1.2610	15.703	63.694	9.5948	12.681	20.290
164	1.2691	15.809	63.251	10.5579	13.828	22.125
168	1.2773	15.915	62.814	11.4673	14.950	23.920
172	1.2855	16.021	62.422	12.7165	16.47	26.36
176	1.2936	16.127	61.996	13.8657	17.43	27.89
180	1.3018	16.233	61.614	15.2343	19.47	31.96
184	1.3099	16.339	61.200	16.6030	21.08	33.73
188	1.3181	16.445	60.790	18.1447	22.89	36.63
192	1.3262	16.551	60.423	19.7441	24.75	39.60
196	1.3344	16.657	60.024	21.4297	26.69	42.71
200	1.3426	16.763	59.666	23.2962	28.85	46.16

GALVANIZED SHEET IRON

SIZES AND WEIGHTS

Gauge	Size	Ounces per Sq. Foot	Weight of Sheet in Lbs.	Gauge	Size	Ounces per Sq. Foot	Weight of Sheet in Lbs.
14	24x84	52½	46	23	36x84	20½	27
"	26x84	"	49½	"	40x84	"	20
"	28x84	"	53½	"	24x96	"	20½
"	30x84	"	57½	"	26x96	"	22½
16	24x84	42½	37	"	28x96	"	24
"	26x84	"	40½	"	30x96	"	25½
"	28x84	"	43½	"	32x96	"	27½
"	30x84	"	46½	"	36x96	"	31
"	24x96	"	42½	"	40x96	"	34½
"	26x96	"	46	"	44x96	"	37½
"	28x96	"	49½	24	24x84	18½	16½
"	30x96	"	53	"	26x84	"	17
18	24x84	34½	30½	"	28x84	"	19
"	26x84	"	32	"	30x84	"	20½
"	28x84	"	35½	"	32x84	"	22
"	30x84	"	37½	"	36x84	"	24
"	36x84	"	45½	"	40x84	"	27
"	24x96	"	34½	"	24x96	"	18½
"	26x96	"	36½	"	26x96	"	20
"	28x96	"	40½	"	28x96	"	21½
"	30x96	"	42½	"	30x96	"	23
"	36x96	"	51½	"	32x96	"	24½
19	28x84	30½	31	"	36x96	"	27
20	24x84	26½	23	"	40x96	"	31
"	26x84	"	25	"	44x96	"	34
"	28x84	"	27	26	24x84	14½	12½
"	30x84	"	29	"	26x84	"	13
"	36x84	"	34½	"	28x84	"	14½
"	24x96	"	26½	"	30x84	"	16
"	26x96	"	28½	"	32x84	"	17
"	28x96	"	31	"	36x84	"	19
"	30x96	"	33	"	24x96	"	14½
"	36x96	"	42	"	26x96	"	15½
22	24x84	22½	19½	"	28x96	"	17
"	26x84	"	21½	"	30x96	"	18½
"	28x84	"	23	"	32x96	"	19½
"	30x84	"	24½	"	36x96	"	21
"	36x84	"	29½	28	24x84	12½	11
"	40x84	"	33	"	26x84	"	11½
"	24x96	"	22	"	28x84	"	12½
"	26x96	"	24½	"	30x84	"	13½
"	28x96	"	26½	"	32x84	"	14½
"	30x96	"	28	"	36x84	"	16
"	36x96	"	33½	"	24x96	"	12½
"	40x96	"	37½	"	26x96	"	13½
23	24x84	20½	18	"	28x96	"	14½
"	26x84	"	19½	"	30x96	"	15½
"	28x84	"	21	"	32x96	"	16½
"	30x84	"	22½	"	36x96	"	18½
"	32x84	"	24				



MASSACHUSETTS DISTRICT POLICE

Boiler Inspection Department.

Office, State House.

Requirements of Boiler Inspection Department of District Police as to Fittings for Low Pressure Heating Boilers.

Upon all steam boilers used for heating purposes, having a grate area of over two square feet and subject to inspection by this department, the following fittings must be provided, being deemed necessary for safety.

One safety valve on each boiler, with no obstruction between valve and boiler. If pressure carried is to be below 25 pounds, the least area of the safety valve in inches is to be reckoned by dividing the area of grate in square feet by $2\frac{1}{2}$ if a pop valve is used, or by 2 if a lever, weight, or simple spring valve is used.

One steam gauge on each boiler, connected with syphon or equivalent device between gauge and boiler, to fill gauge spring with water. The supply pipe is to come from steam space of boiler.

Each boiler must have at least two try cocks, the lower one to be placed $2\frac{1}{2}$ inches above the fusible plug or lowest safe water line. Where a glass is also used, the lower end of glass must be above the fusible plug or lowest safe water line.

Each boiler must be provided with stop valve on main steam pipe leading from boiler. Each boiler must have check valve and stop valve on main return pipe.

Where a damper regulator is used, the pressure supply pipe must be taken from the steam space of the boiler.

Safety Valves for High Pressure.

If pressure carried is between 25 and 100 pounds, the area of safety valve in inches must equal the area of grate in square feet divided by 3, for lever or dead weight valves, and by 4 for pop valves. If pressure is above 100 pounds, divide by 5 for pop valves and 4 for lever or dead weight valves.

Joseph E. Shaw
Chief Mass. District Police

Form No. 13A.



Commonwealth of Massachusetts.

DISTRICT POLICE.

INSPECTION DEPARTMENT.

Mass., 190

SIR:

In the ventilation of school buildings the many hundred examinations made by the inspectors of this department have shown that the following requirements can be easily complied with:—

1. That the apparatus will, with proper management, heat all the rooms, including the corridors, to 70° F. in any weather.
2. That, with the rooms at 70° and a difference of not less than 40° between the temperature of the outside air and that of the air entering the room at the warm-air inlet, the apparatus will supply at least thirty cubic feet of air per minute for each scholar accommodated in the rooms.
3. That such supply of air will so circulate in the rooms that no uncomfortable draught will be felt, and that the difference in temperature between any two points on the breathing plane in the occupied portion of a room will not exceed 2°.
4. That vitiated air in amount equal to the supply from the inlets will be removed through the ventiducts.
5. That the sanitary appliances will be so ventilated that no odors therefrom will be perceived in any portion of the building.

To secure the approval of this department of plans showing methods or systems of heating and ventilation, the above requirements must be guaranteed in the specifications accompanying the plans.

Inspector of Fireworks and Public Buildings

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